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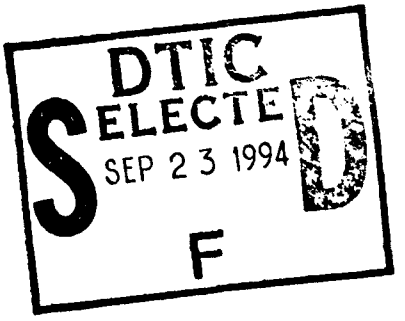

STANDARDIZATION OF PROTOCOL FOR THE SAMPLING, TESTING AND ABATEMENT OF ASBESTOS CONTAINING JOINT COMPOUND

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AFIT/GEE/ENV/94-S

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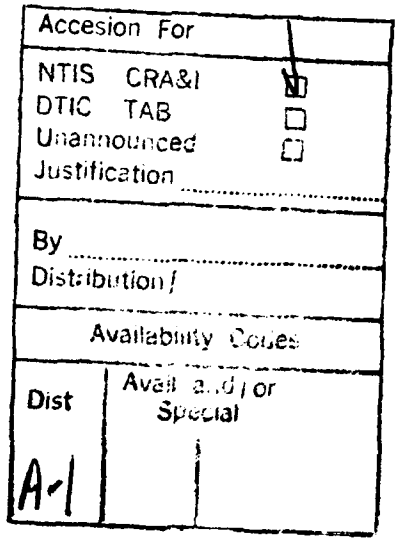

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STANDARDIZATION OF PROTOCOL FOR THESAMPLING, TESTING AND ABATEMENT OFASBESTOS CONTAINING JOINT COMPOUND

THESIS

Presented to the Faculty of the School of Engineering

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Science in

Engineering and Environmental Management

Gary J. Schneider, B.S.

Captain, USAF

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Preface

The purpose of this study was to determine the most appropriate protocol to follow concerning abatement of Asbestos Containing Joint Compounds (ACJC) found in AFB facility wall systems. While trying to protect worker health and safety and limiting governmental liability, the interpretation of governmental regulatory guidance produced the need for this research.

A spreadsheet was designed with a Monte Carlo simulation which produced potential exposure levels which might be experienced by abatement workers. This research has concluded that, while there is a need for a better understanding of the carcinogenic effects of asbestos, the demolition of wall systems that contain ACJC may result in exposure levels which exceed permissible exposure limits set forth by the *Occupational Safety and Health Administration*.

During the research and writing of this thesis, I have had a great deal of help from others. I am deeply indebted to my faculty advisor, Dr. Thomas Hauser, for his continuing patience and guidance throughout my graduate studies. I also wish to thank Dr. Charles Bleckmann for all of his direction and guidance, without which I could not have successfully completed this work. Finally, I would like to thank Michael Beard of the EPA's Atmospheric Research and Exposure Assessment Laboratory, Research Triangle Park, N.C. who provided me with a great deal of help and information.

Gary J. Schneider

TABLE OF CONTENTS

List of Tables

List of Figures

ABSTRACT

This study investigated the differing regulatory guidelines from the Occupational Safety and Health Administration and the Environmental Protection Agency concerning the abatement of Asbestos Containing Joint Compound (ACJC). The specific interest was whether or not adequate protection was being afforded demolition workers when exposed to working with ACJC materials that contain less than 1.0 percent asbestos. A literature review revealed no prior research into regulatory inconsistencies concerning asbestos. A spreadsheet was written which used a Monte Carlo simulation technique to estimate the exposure scenario which might be experienced within a given room size on a demolition or renovation jobsite. Spreadsheets were calculated for ACJC with an asbestos content of 0.1 to 0.9 percent in 0.1 increments for rooms ranging in size from 15ft x 25ft x 8ft to 200ft x 25ft x 8ft. The literature review provided estimates for air exchange, demolition, and ACJC application rates. The fraction of sheetrock pulverized was estimated with a computer generated uniform random distribution in the range of 0.30 to 0.70. Two hundred iterations were used to compute an average exposure concentration for each room size, each size being represented by a spreadsheet. In all cases, the results indicated that the exposure potential created by the manual demolition of ACJC exceeded the OSHA permissible exposure limit of 0.2 f/cc. This finding resulted in the conclusion that the Air Force should perform personal air sampling on individuals to determine if the exposure levels simulated in this research are comparable to those experienced in the workplace. Until this research is validated by such efforts, it is recommended that ACJC abatement actions be performed within negative air containment systems equiped with high efficiency partculate air (HEPA) filters.

STANDARDIZATION OF PROTOCOL FOR THE SAMPLING, TESTING AND ABATEMENT OF ASBESTOS CONTAINING JOINT COMPOUND (ACJC)

I. INTRODUCTION

PROBLEM STATEMENT

The removal of asbestos containing materials (ACM) has become an important and costly environmental problem. ACM removal has added major costs to the renovation, alteration and demolition of Air Force facilities. The agencies which regulate the removal and disposal of ACM are the Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA). These two agencies, while following many of the same Congressionally mandated laws, have created somewhat conflicting regulations which leave room for interpretation by affected Air Force Bases.

Asbestos-Containing Materials (ACM) have been widely used in the building construction industry, with 1000 different construction uses having been identified (BNA, 1987:57). Some uses of ACM include sprayed or troweled-on surfacing compounds for walls and ceilings; insulation products found around hot and cold water pipes, ducts, boilers and tanks; and a variety of products such as floor and ceiling tiles (Environmental Institute, 1991:S-1). In 1984, the EPA estimated that approximately 733,000 public, commercial, and residential buildings in the United States contain some form of asbestos containing material (BNA, 1987:2). The use of these products have resulted in a major problem on Air Force installations where facility alterations, renovations, or demolitions are required.

The maintenance, removal, and disposal of ACM has become heavily regulated due to studies indicating the carcinogenic effects of airborne asbestos fibers. Exposure to asbestos fibers was first linked to respiratory health effects in the early 1900's, but it was not until 1960 that the connection between mesothelioma (cancer of the pleural lining of

the chest) and asbestos exposure was widely accepted (BNA, 1987:2). Based on scientific studies conducted in the late 1980's, four major diseases or health changes are associated with asbestos exposure. According to the National Research Council, these diseases include lung cancer, mesothelioma, pulmonary asbestosis, and pleural plaques (BNA, 1987:3).

One particular ACM, Asbestos Containing Joint Compound (ACJC), is a difficult problem to deal with due to differing regulatory guidelines. ACJC was used in the construction industry from 1945 to 1975 (HEI, 1991:4-4). The regulation guidance regarding asbestos is usually quite clear, but in the case of materials such as ACJC, the low level content of asbestos in the material has created a gray area of guidance from the Environmental Protection Agency (EPA) and the Occupational, Safety, and Health Administration (OSHA).

The regulatory framework which controls the maintenance, handling and disposal of asbestos is in place to protect the environment, the general public, and the worker population. The EPA has the environment and general population as a main concern, while OSHA is in place to protect the worker population. The differing goals of these two agencies create the situation in which their requirements are inconsistent or incompatible.

In the case of ACJC, the EPA has given guidance which requires the composite sampling of wall systems to determine asbestos content. If the composite testing indicates less than 1.0% asbestos by area, the material does not fall under EPA asbestos regulation requirements (Rasnic, 1992:4). OSHA, on the other hand, requires the testing of individual components of the wall system. If any one component is found to contain 0.1% or more asbestos by weight, then certain asbestos regulations become required (Clark, 1993:4). These differing action levels concerning the abatement of ACJC have created ambiguous guidance which requires further clarification.

CURRENT DIFFERING INTERPRETATIONS

Due to the ambiguity between EPA and OSHA guidance, some Air Force installations have taken on different interpretations. For example, Wright-Patterson Air Force Base abates only that material whose lab results report it to contain greater than 1.0 percent asbestos. Material whose results report less than 1.0 percent asbestos are considered to contain only "trace" amounts of asbestos and thus are not abated (Leggen, 1993). McClellan Air Force Base, however, chooses to treat demolition and renovation projects differently. If the ACJC has an asbestos content of greater than 0.1% and the project is a repair or renovation, then abatement is accomplished under full containment per Title 40 of the Code of Federal Regulations (CFR). If, however, the project is a complete building demolition, the less conservative EPA guidance of greater than 1.0% is used as the action level.

These differing interpretations present two possible problems.

1) If OSHA guidance is followed, it may be overly conservative worker protection, resulting in an excessive expenditure of tax dollars.

2) If EPA guidance is followed, the owner/operator of the abatement activity would be well advised to monitor worker exposure to airborne asbestos fibers. This monitoring effort might prove the adequacy of the EPA action level, thus proving the OSHA action level as too conservative. To determine whether or not workers are adequately protected against airborne asbestos exposure, this research will attempt to quantify potential worker exposure. The level of exposure will then be used to justify one of the following:

1) The EPA action level.

2) The OSHA action level

3) An Action Level proposed as a result of this research.

THESIS GOAL STATEMENT

The goal of this research is to describe the course(s) of action that government agencies should take concerning the discrepancies between EPA and OSHA guidelines pertaining to the removal of asbestos containing sheet rock. A model will be developed to determine the exposure levels that may occur on ACJC demolition job sites. The exposure levels will indicate if OSHA action levels have a potential for being exceeded. This information will be used to determine the appropriate regulation to follow. Specifically, the goals of this research include:

1) A defensible document which will summarize the proposed steps to be followed when abating ACJC materials which contain less than 1.0 percent asbestos.

2) The conducting of thorough research of all EPA and OSHA guidance documentation, the defining of their differences, and the determination of the highest action level which will adequately protect worker health and safety.

3) Suggested course(s) of action that the government should follow concerning the differing EPA and OSHA guidelines pertaining to the removal of ACJC on sheetrock walls.

4) A proposed action level which will protect human health and the environment. The outcome of this research will be a proposed action level which may or may not match that of either the EPA or OSHA.

5) A discussion of the "Do Nothing" option, and how it might affect future financial liabilities to the Government.

Having accomplished this task, the most cost effective plan for the protection of worker health and the environment will be achieved.

II. LITERATURE REVIEW

DEFINING ASBESTOS

Asbestos is the name given to a group of naturally occurring mineral silicates that are separable into fibers. The various forms of asbestos are differentiated from one another by size and shape of the fibers. Serpentine asbestos, predominantly chrysotile, is curly. Amphiboles, crocidolite and amosite, being long and thin, are the most important because they have been indicated as the most carcinogenic of the six mineral types (Gots, 1993:209). The EPA, as well as OSHA, consider all materials containing specified amounts of the mineral forms of chrysotile, crocidolite, amosite, anthophyllite, tremolite, and actinolite to be Regulated Asbestos Containing Materials (RACM) (BNA, 1987:11). Each of these minerals are found in specific geographic locations, with chrysotile being the most prevalent form naturally occurring in the United States. This availability of chrysotile has resulted in it comprising 95 percent of all forms of commercially used asbestos in the United States (Gots, 1992:212). The remaining 5 percent comes mostly from the amosite and crocidolite groups. Asbestos containing products may contain mixtures of more than one type of asbestos, with mixtures of chrysotile, crocidolite and amosite being most commonly found (EPA, 1990B:2-5).

The use of asbestos in a product may not always present a hazard. If the product is incapable of releasing the mineral fibers into the air, there is no exposure pathway, and thus, no carcinogenic risk to the human population.

FRIABILITY

Friable asbestos material is defined as any material that contains more than 1.0 percent asbestos as determined by the Polarized Light Microscopy (PLM) method as specified in Section I of Appendix A, Subpart F, 40 CFR Part 763; and, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure (Environmental Institute,

1991:7; EPA, 1982:763.121; EPA, 1990B:2-2). In other words, while being disturbed, if hand pressure can result in the release of fibers to the atmosphere, the material is friable. By definition, friability would not apply to ACJC with less than 1.0 percent asbestos, however, OSHA still regulates ACJC with as little as 0.1 percent asbestos (Clark, 1993:1).

The EPA has categorized non-friable ACM's as follows (EPA, 1990B:2-1):

> Category I non-friable ACM includes asbestos containing packing, gaskets, resilient floor covering, and asphalt roofing products, containing more than 1.0 percent asbestos as determined by PLM as described in Appendix A, Subpart F, 40 CFR 763.
>
> Category II Non-friable ACM includes any material, excluding Category I non-friable materials, which contain more than 1.0 percent asbestos as determined by PLM according to the above methods, and when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure .

Assuming that an ACJC has an asbestos content greater than 1.0 percent asbestos, ACJC can fall under more than one category. If the wall or surface is in good condition and the joint compound cannot be pulverized by hand pressure, then the material is considered a Category II non-friable material. Under demolition conditions, however, ACJC does become friable once the wall system has been disturbed. The caveat of "hand pressure" is no longer valid if the disturbance results in the release of asbestos fibers into the air. Therefore, material with greater than 1.0 percent asbestos would be classified as an asbestos containing material during demolition actions. The demolition of such a wall system results in the need to determine how much asbestos is released from the ACJC while being demolished.

IDENTIFICATION AND QUANTIFICATION OF ASBESTOS FIBERS

DIFFERING TYPES OF ASBESTOS: As previously discussed, there are six commercially used types of asbestos. They include chrysotile, crocidolite, anthophyllite, amosite, actinolite, and tremolite. Transmission Electron Microscopy (TEM) analysis, as described in a following section, is capable of delineating between the different mineral

forms of asbestos. This is important due to the questionable carcinogenicity of the differing mineral forms of asbestos.

Currently, literature has indicated that there is doubt as to whether or not chrysotile is as hazardous as other forms of asbestos (Gots, 1993:211; HEI, 1991:1-9). At the time of this writing, however, no scientific studies have been conducted which prove or disprove this theory. If chrysotile is ever proven to be harmless or significantly less hazardous than other forms of asbestos, it would have an enormous impact on the asbestos abatement industry, affecting approximately 95 percent of commercially used ACM's (Gots, 1992:212).

DIFFERING FIBER SIZES AND ASPECT RATIOS

In previous studies, the calculation of risk from exposure to airborne asbestos fibers has been focused on those fibers greater than 5.0μm in length. The precise value of 5μm has no particular significance other than the delineation of a minimum fiber length for the calculation of an exposure index. It was arbitrarily selected for reporting PCM fiber counts, and thus much of the historically available data is based on this minimum fiber length (HEI, 1991:4-12).

Although the 5μm length was arbitrarily chosen, it is believed that the greater the ratio of fiber length to its diameter (aspect ratio), the more hazardous the fiber (Gots, 1992:212). This leads to the conclusion that longer fibers are more hazardous. The big unanswered question is whether or not asbestos fibers become non-hazardous at some length shorter than 5μm. Per 29 CFR 1926.58 and 40 CFR 763.121, both the EPA and OSHA have defined the term

"fiber" as:

> ... a particulate form of asbestos, tremolite, anthophyllite, or actinolite, 5 micrometers or longer, with a length- to-width ratio of at least 3 to 1.

This definition results in the quantification of asbestos using only those fibers as described in the above definition. Research is still required to justify the exclusion of particles which do not meet the definition of a fiber, but still may have an adverse effect on human health.

ANALYTICAL METHODS OF ASBESTOS QUANTIFICATION

There are three methods used to analyze airborne and bulk sample asbestos concentrations, Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), and Phase Contrast Microscopy (PCM). Polarized Light Microscopy, a me for analyzing asbestos concentrations in bulk samples only, will also be discussed in the following text. The recommended option for both air and bulk samples is TEM, as it has the greatest specificity and sensitivity for asbestos fiber identification (EPA, 1985:3-1). PCM, however, incurs less cost and is more available across the nation. SEM needs improvements in its standard protocol and standardized reference materials. The following section describes these methods in greater detail.

TEM is a method of analysis which utilizes an electron beam that is focused onto a thin sample. As the beam penetrates (transmits) through the sample, the difference in densities produces an image on a fluorescent screen from which samples can be identified and counted (EPA, 1990B:1-6).

The major disadvantage of TEM are the cost and the time required for the analysis. It is also less available than other methods. The analysis can be broken down into three levels to reduce cost and time for analysis (EPA, 1990E:11):

Level I: Identification of asbestos fibers is based on fiber morphology and the observed Selective Area Electron Diffraction (SAED) pattern on the fluorescent screen.

Level II: Analysis of the chemical composition of each fiber by Energy Dispersive x-ray analysis (EDXA) is added to the Level I procedures.

Level III Quantitative analysis of SAED patterns from a few representative fibers is added to Level II procedures.

Transmission Electron Microscopy is considered the better of the two types of electron microscopy used for measuring airborne asbestos concentrations as well as bulk samples (EPA, 1990E:11).

PLM is an optical microscopic technique used to distinguish between different types of fibers based on their shapes and unique optical properties. PLM is commonly used to determine the presence of asbestos in bulk samples of suspected ACM (EPA, 1990B:1-6). PLM point counting measures asbestos per area, while some methods measure percent asbestos by weight. The EPA definition of ACM was revised in 1990 to material containing 1.0 percent asbestos "by area" due to the inability to directly correlate "by area" and "by weight" estimation analysis methods. The accuracy of quantitative data from either visual or point counting PLM estimations is dependent upon several factors including: sample homogeneity, asbestos fiber size, the presence of interfering matrix/binder material, and the skill of the microscopist (EPA, 1990D:48410).

If asbestos content is estimated at less than 10 percent by a method other than point counting, such as visual estimation, the EPA has revised the definition to require that the determination be repeated using the point counting technique with PLM. Point counting, a systematic technique for estimating concentration, may be useful in quality assurance activities, especially in establishing a relationship between point counts and visual estimation procedures (EPA, 1990D: 48410).

PCM is an optical microscopic technique used for counting fibers in air samples, but which does not distinguish asbestos fibers from non-asbestos fibers of similar size, shape and aspect ratio (EPA, 1990B:1-6). PCM can only be used to identify the existence of asbestos-like fibers, but does not delineate asbestos fibers from non-asbestos fibers.

Scanning Electron Microscopy is a method of microscopic analysis which utilizes an electron beam directed at the sample and then collects the beams that are reflected to

produce an image from which fibers can be identified and counted (EPA, 1990B:1-6). SEM is more sensitive to thin fibers and has better specificity for asbestos than PCM (EPA, 1990E: 10). At the time of this writing, however, there is no standard method, no quality assurance laboratory testing, and no National Institute of Science and Technology (NIST) reference materials for SEM. In spite of this , SEM is still more available and much less expensive than TEM (EPA, 1990E:10).

There are two serious limitations in some of the methods described above. The first is that PCM cannot distinguish between asbestos and non-asbestos fibers, rather, PCM counts all elongated particles that meet the length, diameter, and aspect ratio criteria. The second limitation is a result of the optical magnification under PCM. Only fibers or particles 0.25 micrometers in diameter or larger can be seen (EPA, 1990E:10). Table I-1 shows the comparative capabilities of the three principle analysis methods.

TABLE 2-1: COMPARISON OF PHASE CONTRAST, SCANNING ELECTRON, AND TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL METHODS FOR ASBESTOS IDENTIFICATION AND QUANTIFICATION (EPA, 1990E:10)

	PCM	SEM	TEM
Specificity for asbestos	Not specific (all fibers greater than 5μm long are counted)	More specific but not definitive	Definitive
Magnification	400	1000-2000	20,000
Sensitivity (Thinnest fiber visible)	0.15μm (best) 0.25μm (typical)	0.05μm (best) 0.20μm (typical)	0.0002μm (best) 0.0025μm (typical)

NOTE: PLM is used for bulk sample analysis only, and as such, does not appear in the above table. Due to the need for standardized analysis methods for air and bulk samples, PLM will not be considered for use in this research.

As summarized in the above table, PCM, TEM, and SEM offer clear choices for measuring airborne asbestos concentrations. PCM has historically been the most widely used method due to its low cost, availability, and its capability of meeting OSHA workplace exposure standards. PCM is, however, often only a rough indicator of asbestos contamination.

TEM is better than PCM on all of its characteristics. TEM is more sensitive to thin fibers and more specific for asbestos, but is also more expensive and less available.

SEM lies somewhere between TEM and PCM on most characteristics. It is more sensitive to thin fibers and more definitive for asbestos than PCM, but the turn around time for SEM samples is longer than that of PCM, but shorter than TEM. SEM's greatest handicap is its lack of standardized protocol for sample preparation and analysis. The cost of SEM falls somewhere between that of PCM and TEM, but due to the lack of standardized testing protocol, is rarely used in the abatement industry today.

From the data in Table 2-1, it becomes clear that TEM is by far the most definitive form of analysis. PCM is the least definitive, being used primarily to screen for asbestos-like fibers. SEM, while better than PCM, is still much less definitive than TEM, and is not the method of choice for ACJC asbestos quantification (EPA, 1990E:1-6).

ASBESTOS UNITS OF MEASURE

Asbestos is quantified in several different ways. The following is a list of the possible units produced by TEM, PCM, PLM, or SEM.

BULK SAMPLES: percent asbestos by area
percent asbestos by weight

AIR SAMPLES: fibers per milliliter or cubic centimeter (f/mL) (f/cc)
Bundles of fibers per milliliter (b/mL)
cluster of fibers per milliliter (c/mL)
structures per milliliter (s/mL)
mass per cubic meter (ng/m^3)

The different units of measure for concentrations of asbestos fibers cannot easily be compared. In 1971, OSHA reduced the acceptable exposure level to 5 f/cc, for "fibers greater than 5μm in length" (Gotts, 1993:211). Due to this, the majority of data is a

measurement of asbestos concentration for fibers greater or equal to 5μm in length. When using published data, it is important to clarify the exact parameters that the data units represent.

Due to the minute amounts of asbestos being measured, and to reflect industry standards, data in this research will often be reported in fractions of a fiber, such as .005 f/cc. When actually measured, a known volume of air is pumped through a filtration device, normally measured in liters or cubic meters. Therefore, a measurement of .005 f/cc is the same as 5000 f/m^3, or 5 f/L.

AMBIENT BACKGROUND LEVELS OF AIRBORNE ASBESTOS FIBERS

TEM can be used to monitor the outdoor ambient level of asbestos concentrations. There are over twenty published papers which have tried to quantify ambient outside air asbestos concentrations (HEI, 1991:4-36). The reader is directed to the Health Effects Institute reference document for a tabulation of results from these studies. Concentrations found in rural areas with no natural asbestos sources ranged from 0.0002 to 0.0006 f/cc depending on the location (HEI, 1991:4-39). Higher concentrations of 0.002 to .00005 f/cc have been reported in urban areas (HEI, 1991:4-38).

The EPA has stated in its guidance that 0.005 f/cc is a "typical outdoor asbestos level in urban areas, as measured by TEM" (BNA, 1987:26).

MONITORING OF AIRBORNE ASBESTOS CONCENTRATIONS

Because of their small size, airborne asbestos fibers are difficult to distinguish from other man-made and natural fibers (EPA 1990E:12). An asbestos fiber, once released into the air by any means, will enter a phase of downward settling determined by its mass, form, and axis attitude. The range of these fiber attributes strongly affect the settling velocities and hazard potential, since those fibers which are able to remain aloft for many hours have a higher exposure probability than rapidly settling fibers. The settling velocity

of a fiber is strongly dependent upon fiber diameter and to a lesser extent, fiber length (EPA, 1979B:I-2-3). It is these airborne asbestos fibers which require analytical sample monitoring in an effort to protect the health of the asbestos abatement workforce.

The monitoring of the workplace for airborne asbestos is regulated by OSHA. OSHA's General Industry Standards (29 CFR 1910.1001) and Construction Standards (29 CFR 1926.58) both require employers to initiate air monitoring, medical surveillance, and employee training if employees are exposed at or above the action level of 0.1 fibers per cubic centimeter calculated as an eight-hour time weighted average (Arbuckle, 1993:407).

The monitoring of air for asbestos concentrations is accomplished by either TEM, PCM, or SEM analysis methods. Monitoring on a jobsite is conducted for three different reasons: (1) To determine ambient pre-construction airborne concentration levels, (2) To determine the level to which workers are being exposed, and (3) To certify a building as "clean" after an abatement action. These monitoring actions are accomplished with the use of vacuum pumps which draw air through filters, thus collecting the fibers from a given volume of air. These filters are then analyzed in the laboratory by one of the three analysis methods to determine the airborne asbestos concentration per unit of air.

EPA REQUIREMENTS

MONITORING: The EPA has promulgated regulations specifically addressing asbestos emissions from demolition, renovation, and disposal operations. The regulation of asbestos emissions fall under the National Emission Standards for Hazardous Air Pollutants (NESHAP) found in 40 CFR Part 61.12. The standard does not set a numerical threshold for asbestos fiber emissions, but requires EPA notification of projects concerning removal of specified amounts of ACM.

CONTAINMENT DURING REMOVAL (40 CFR 763; Subpart G): The EPA requires containment for those removal actions which involve ACM with greater than 1.0 percent asbestos by area. The EPA clarified "by area" in the 20 November, 1990 volume

of the Federal Register. This was required because some analysis techniques measure asbestos content by weight, which cannot be directly converted to asbestos content by area. This discrepancy greatly affects the results when such a small amount of the mineral is being measured.

Additional containment requirements can be found in 40 CFR 763, Subpart G. This document establishes requirements which must be followed during asbestos abatement projects performed by employees of state and local governments not covered by the OSHA standards in 40 CFR 1926.58.

NOTIFICATION (40 CFR 61.145): Asbestos removal action notification to the EPA is required when the quantity of ACM exceeds 260 linear feet on piping or 160 square feet on other facility components. Other notification requirements for demolition and renovation work are required for lesser amounts of ACM as dictated in 40 CFR Part 61.

ACJC ANALYSIS: According to the EPA, where demolition or renovation impacts a wall system, a composite analysis of the wall system (an analysis of percent asbestos in joint compound, tape, and wall board) should be conducted. If the composite sample shows asbestos content greater than 1.0 percent by area and at least 160 square feet of the wall system is involved in the demolition or renovation, then the project would be subject to the asbestos NESHAP (Resnic, 1992:1). Resnic further stated that the EPA directs the use of composite sampling because it believes that when joint compound and/or tape is applied to wallboard, it becomes an integral part of the wallboard and in effect becomes one material forming a wall system.

The sampling and analysis of a suspect ACM must be accomplished according to strict protocol. The EPA has issued a policy which requires the use of the published analysis procedure as set forth in 40 CFR Part 763, Appendix A, Subpart F, entitled, "Interim Method for the Determination of Asbestos in Bulk Samples". Based on optical crystallographic properties, the PLM method must be performed by a microscopist with

formal training in optical mineralogy. PLM gives a qualitative differentiation between asbestos and non-asbestos fibers along with a quantitative estimate of percent asbestos by area and volume. The results of PLM analyses are interpreted by the EPA as follows:

> If one or more samples from a homogenous suspect ACM contains greater than 1.0% asbestos by area, the entire material is considered to contain asbestos. If a doubt exists, or if further information is required, samples should be re-analyzed or additional samples should be collected. (EPA, 1990B:8-4)

OSHA REQUIREMENTS

MONITORING (29 CFR Part 1926.58): OSHA requires an employer to begin air monitoring, employee training, and medical surveillance when the action level of 0.1 f/cc is reached. The permissible exposure limit for an employee is 0.2 f/cc of air, averaged over an 8-hour period.

DISPOSAL (40 CFR Part 61.150): Disposal requirements for ACM are covered under the Clean Air Act's National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations, 40 CFR Part 61.150. OSHA has no regulation specifically requiring specific disposal requirements, however, OSHA does require material with greater than 0.1 percent asbestos to be labeled as "asbestos". This ultimately requires the following of the NESHAP requirement for disposal of the material as asbestos-containing waste. That is, by default, the OSHA labeling requirement produces the need to dispose of material with an asbestos content of 0.1 to 1.0 percent as an asbestos-containing waste, when in fact, the EPA and NESHAP definition of ACM does not consider it to be asbestos-containing for disposal purposes.

CONTAINMENT DURING REMOVAL (29 CFR 1926.58): During asbestos abatement actions, glovebag or containment enclosures are required to eliminate asbestos jobsite emissions. Part 1926.58 includes requirements for the containment structure, hygiene facilities, signs, protective equipment, and air filtration systems. This part also details work procedure requirements within the containment structure. Containment

requirements are not dictated by the amount of asbestos in a given material, but by the amount of asbestos that will potentially become airborne. Containment structures are used to eliminate the emission of airborne asbestos from the worksite area, while also being used to contain the contaminated air volume until it can be filtered through a High Efficiency Particulate Air (HEPA) filtration system.

NOTIFICATION: OSHA does not currently require prior notification of abatement activities. OSHA has, however, proposed a project reporting requirement in the July 20, 1990 volume of the Federal Register (Arbuckle, 1993:408).

IS ACJC AN ACM?: Regardless of whether or not a given ACJC is considered by OSHA to be an ACM, some requirements of 29 CFR 1926.58 apply whenever various types of work are performed involving ACJC or other ACM regardless of the asbestos content. One such type of work is the demolition of a facility (29 CFR 1926.58(a).

ACJC ANALYSIS (Clark, 1993:3): OSHA considers composite sampling as unacceptable for either determining whether asbestos is present in a material or determining whether or not an asbestos hazard warning label is required. If asbestos is present in any one component of a material, then the material comes under the scope of 29 CFR 1926.58. In addition, if asbestos is present in concentrations of 0.1 percent or more by weight, then labeling requirements become binding. OSHA regulations do not specify methods for determining the asbestos content of joint compounds or any other materials.

EXPOSURE LIMITS (29 CFR 1910 and 1926): OSHA originally stipulated a maximum exposure of 5.0 fiber/cc which are greater than 5μm in length over an 8-hour period on a time weighted average (TWA) basis. A maximum of 10.0 f/cc for a 15 minute sampling period was the allowed one-time excursion. On October 9, 1975, OSHA proposed a limit of 0.5 f/cc TWA and 5.0 f/cc maximum excursion over a 15 minute period. On July 1, 1976, the original requirement in the regulation was reduced to 2.0 f/cc with the maximum excursion permitted remaining at 10.0 f/cc (EPA, 1979:I-3-2). In 1986, the exposure limit was further reduced to 0.2 f/cc (Cherry, 1988:3). Levels found in

indoor air, even in rooms with damaged asbestos insulation are generally less than 1/100th of that amount (Gots, 1993:211).

EMPLOYEE PERSONAL MONITORING: OSHA requires that every employer shall perform initial monitoring on employees who are or may be exposed at or above the action level of 0.1 f/cc (Cherry, 1988:153). Once the PEL of 0.2 f/cc is reached, personal protective equipment (PPE) is required to limit the exposure to a maximum of 0.1 f/cc per 29 CFR Part 1926.58.

OSHA requires construction and the General industry to provide (BNA, 1987:61):

- worker education and training about asbestos hazards
- Engineering controls where feasible, and work practices, including respirators to keep exposure to less than 0.2 f/cc
- Warning labels and signs
- Retention of medical records for 30 years
- Changing rooms, showers, etc.
- Clean areas to eat, drink, etc.

WORKPLACE AIRBORNE ASBESTOS ANALYSIS METHODS

The standard protocol for measuring exposure to airborne asbestos in the industrial workplace adopted by OSHA specifies PCM as the analytical method (EPA, 1990E:9). The method for analyzing asbestos-containing bulk samples is not, however, specified by OSHA. Any reliable method that determines the asbestos content of individual material components is acceptable by OSHA and may be used for determining the asbestos content of joint compounds or other suspect materials (Clark, 1993:1).

OSHA considers composite sampling as unacceptable for either determining whether asbestos is present in the materials or determining whether asbestos hazard warning labels are required. OSHA directs that if asbestos is present in any one of the material components, any repair, demolition, or renovation activity involving the material

comes under the scope of 29 CFR 1926.58. Also, if asbestos is present in any one of the materials in concentrations of 0.1 percent or more by weight, then the container holding the material must have an asbestos hazard warning label regardless of what other materials may also be present in the container. For these reasons, a sampling protocol that determines the asbestos content of the individual material components must be used (Clark, 1993:4).

Labeling is the only OSHA requirement initiated on the basis of the asbestos content of the product exceeding a specific amount. According to 29 CFR 1910.58(k)(2)(vi)(B), labeling provisions do not apply unless asbestos is present in a product in concentrations of 0.1 percent or more by weight (Clark, 1993:1). ACJC debris must be placed in labeled impermeable containers. The levels of employee exposure to airborne asbestos determines what other requirements of the standard apply (Clark, 1993:4).

ACM DISPOSAL

Disposal of asbestos is again based on the definition of asbestos-containing material. If a material does not contain greater than 1.0 percent of asbestos, regardless of friability, the material is not regulated by the EPA, and there are no disposal requirements (U of C, 1993:R-6). Some states, however, require that the material still be placed in air tight containers and labeled "DANGER, ASBESTOS..." (U of C, 1993:R-6).

The department of transportation has classified asbestos as hazardous for transportation purposes. Most states have more stringent requirements on the disposal of asbestos, and many have designated the waste as hazardous (BNA, 1987:53). Regardless of state law, under 40 CFR Part 61.150, ACM waste must be disposed of in the following manner (U of C, 1993:R-6; FERMC, 1993:22):

1. Material shall be wet when removed and kept wet while being containerized.
2. Material shall be placed in leak proof containers with an OSHA danger sign

and the name and address of the owner/generator.

3. The shipment must have a hazardous waste manifest.
4. The shipment of asbestos waste shall be transported in an approved vehicle with a trained driver. The vehicle must display warning signs during loading and unloading.
5. Disposal of the material shall be at a site operated in accordance with 40 CFR Part 61.154.

ASBESTOS AND HUMAN HEALTH

Asbestos has been shown to cause four major diseases, but the actual risk experienced by the asbestos abatement industry workforce is difficult to quantify. There are several differing studies that indicate that lung cancer increases at a rate in line with the level and duration of exposure (BNA, 1987:3). The variables involved in such studies are numerous, however, making it difficult to arrive at an absolute conclusion. One variable is the differing type of asbestos, each type possibly presenting differing levels of risk. It is not known whether the different mineral forms of asbestos present differing levels of carcinogenic risk, but the question of whether or not certain fiber types are less hazardous, or perhaps even harmless has become the subject of substantial debate (Gots, 1992:210).

The risk associated with changing levels of exposure is also a variable which requires additional research. Asbestosis, mesothelioma, and lung cancer are all caused by asbestos. Here the science is quite clear. What is less clear, however, is at what exposure concentration is a person taking on an unacceptable level of risk (Gots, 1992:211). According to the National Research Council, residents of urban areas face a lifetime risk of between 1 in 100,000 and 7 in 100,000 of developing cancer as a result of asbestos in the ambient air (BNA, 1987:3). This risk is quite high compared to the normally accepted cancer risk level of 1 in one million. If the estimate from the National Research Council is correct, the hazards associated with ambient levels of asbestos will have a major impact on

the acceptable level to which abatement workers should be exposed. Some estimates of lifetime cancer risks for different exposure scenarios are found in Table 2-2.

TABLE 2-2: Estimated Lifetime Cancer Risks for Different Scenarios of Exposure to Airborne Asbestos Fibers[a] (HEI, 1991:1-11; Gots, 1992:215).

Conditions	Premature Cancer Deaths (Lifetime Risks) per Million Exposed Persons
Lifetime continuous outdoor exposure	
- 0.00001 f/cc* from birth (rural)	4
- 0.0001 f/cc from birth (high urban)	40
Exposure in a school containing ACM, from age 5-18 years (180 days/year, 5 hours/day)	
- 0.0005 f/cc (average)[b]	6
- 0.005 f/cc (high)[b]	60
Exposure in a public building containing ACM age 25-45 years (240 days/year, 8 hours/day)	
- 0.0002 f/cc (average)[b]	4
- 0.002 f/cc (high)[b]	40
Occupational exposure from age 25 to 45	
- 0.1 f/cc (current occupational levels)[c]	2000
- 10 f/cc (historical industrial exposures)	200,000

[a] This table represents the combined risk (average for males and females) estimated for lung cancer and mesothelioma for building occupants exposed to airborne asbestos fibers under the circumstances specified.

[b] The "average" levels for sampled schools and buildings represent the means of building averages for the buildings reviewed in the Health Effects Institute (1991) referenced document. The "high" levels for schools and public buildings, shown as ten times the average, are approximately equal to the average airborne levels of asbestos recorded in approximately 5 percent of schools and buildings with asbestos-containing materials.

[c] The concentration shown (0.1 f/cc) represents the permissible exposure limit (PEL) proposed by OSHA. Actual worker exposure, expected to be lower, will depend on a variety of factors including work practices, and use and efficiency of respiratory protective equipment.

* f/cc measurement is fibers per cubic centimeter of air.

Due to the variability of evaluation parameters, experts in the field of epidemiology have differing opinions on measuring the carcinogenicity of asbestos. Mesotheliomas, rare forms of cancer that are strongly associated with asbestos exposure, are considered to be very specific markers of an exposure outcome.

> Malignant mesotheliomas are fatal tumors that develop in mesothelioma cells in the pleura, pericardium, and peritoneum. They are quite rare, only 1648 in the United States recorded between 1973 and 1984. The connection between mesothelioma and asbestos was first described in South Africa miners whose predominant exposure was to crocidolite asbestos. (Gots, 1992:210)

It can be argued that if low-level asbestos exposure were carcinogenic, one would have expected to have seen an excess in mesotheliomas in the population at large from indoor air and other background exposures. Despite the fact that we customarily breathe one million or so fibers each year, numerous epidemeological studies have found no notable risk in the general population (Gots, 1992:212).

The differing opinions concerning the level of risk involved with any exposure may never merge. Some experts believe that a single fiber presents an unreasonable risk, but the belief in such a risk, for now, is based upon subjective beliefs, and is currently unsupported by scientific data.

Specifically, there are two areas of uncertainty which require additional research. These areas of uncertainty include the effects of low level exposure and the different risks of the differing types and sizes of mineral fibers (Gots, 1992:209). During this preliminary literature review, these uncertainties have surfaced as the critical issues of asbestos research.

This research will not attempt to summarize the extensive health and medical implications of asbestos exposure, but will direct the reader to the comprehensive studies, Asbestos in Public and Commercial Buildings: A Literature Review and Synthesis of Current Knowledge (HEI, 1991) and Airborne Asbestos Health Assessment Update (EPA, 1986B). It is important to note that these research documents are not always completely

supported by the multidisciplinary group of experts involved with their development. The document prepared by the Health Effects Institute (HEI) includes the disclaimer that not all literature review panel members agreed on the final document findings. With this in mind, it becomes quite clear that much more research is needed in the areas of asbestos exposure and subsequent carcinogenic occurrences.

LAWS GOVERNING ASBESTOS

In response to the federal, state, and local governments focusing on the ever-increasing attention on the presence of asbestos-containing materials, a plethora of overlapping statutes, ordinances, and regulations have been adopted. Due to the scope of this research, the rules and regulations of individual states will not be addressed. To date, two federal agencies have been principally responsible for generating regulations for asbestos control. These two agencies are the OSHA and EPA. Other federal agencies promulgating regulations regarding asbestos include the Department of Transportation, the National Bureau of Standards, and the Consumer Product Safety Commission.

The EPA has addressed the asbestos issue in two sets of regulations, the Asbestos Hazards and Emergency Response Act (AHERA), 40 CFR 763; and the National Emission Standards for Hazardous Air Pollutants (NESHAPS), 40 CFR 61. OSHA has created the General Industry Standards, 29 CFR 1910; and the Construction Industry Standards, 29 CFR 1926.58. The following paragraphs summarize the major federal regulations which regulate the use, handling, treatment, removal and disposal of ACM's.

THE CLEAN AIR ACT: Under this Act, Congress created a comprehensive regulatory system to reduce, and when possible, eliminate air pollution. 40 CFR 61 is the regulation by which NESHAPs governs the renovation and demolition of buildings that contain asbestos. The NESHAP standard does not set a numerical threshold for asbestos fiber emissions, but requires owner/operators to:

- Notify the EPA prior to the removal action.

- Follow certain ACM removal procedures.

- Adopt standard work practices to prevent the release of asbestos fibers into the air.

- Dispose of the ACM only at certified disposal sites.

WORKER PROTECTION RULE: The EPA worker protection rule in 40 CFR 763, extends provisions of the OSHA asbestos standards to state and local asbestos workers not covered by federal OSHA standards (EPA, 1990B:3-2,1-7).

THE CLEAN WATER ACT: Under this Act, the EPA has set specific effluent limits for discharges of asbestos fibers into the navigable waters of the United States by facilities such as asbestos roofing and floor tile manufacturers (40 CFR Part 427). The EPA has also set performance and pretreatment standards for those facilities which discharge asbestos fibers to public sewer systems (40 CFR 427).

TOXIC SUBSTANCES CONTROL ACT (TSCA): Under TSCA, the EPA has promulgated regulations requiring all persons who manufacture, import or process asbestos to meet certain reporting requirements. Due to the limited scope of this research, the reader is directed to 40 CFR Part 763.60 for a summary of these requirements.

ASBESTOS HAZARD EMERGENCY RESPONSE ACT OF 1986 (AHERA): Due to the serious health hazards associated with asbestos, Congress amended TSCA to include Title III, the AHERA. This Title requires the EPA to establish a comprehensive regulatory framework of inspection, management, planning, operations and maintenance activities, and appropriate abatement responses for controlling ACM's in schools. At the present time, AHERA only affects schools, but there has been considerable attention directed toward the possible regulation of public and commercial buildings in the future, however, at the present time, the EPA does not recommend a regulatory program for public and commercial buildings modeled on AHERA (Arbuckle, 1993:405).

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA): The EPA has not listed asbestos as a hazardous waste under RCRA. Asbestos wastes are treated as solid wastes for the purposes of this Act.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA): Under CERCLA, the EPA has listed asbestos as a hazardous substance (40 CFR 302.4).

OSHA GENERAL INDUSTRY STANDARDS AND CONSTRUCTION STANDARDS: The general industry asbestos standard, 29 CFR 1910.1001 applies to the protection of non-construction workers from airborne asbestos by deteriorating asbestos containing material as released as a result of disturbance by other workers during the performance of maintenance or construction activities, or because of other sources (Clark, 1993:5). The Construction Standard, 29 CFR 1926.58 covers employees engaged in construction or demolition of structures containing asbestos materials.

The OSHA and EPA have each promulgated regulations pertaining specifically to workers involved in the asbestos industry. Both OSHA standards 29 CFR 1910 and 1926 apply to workers involved in the removal, demolition, inspection, repair, maintenance, transportation and disposal of ACM's (EPA, 1990B:3-1). Under both sets of regulations, if employees are exposed at or above the action level of 0.2 f/cc on an eight-hour time weighted average, then the employer must initiate specific air monitoring, employee training, and medical surveillance requirements. 29 CFR 1910.1001 also requires the employer to provide employees with respirator equipment if engineering controls are inadequate to keep the employee exposure to at or below the PEL.

OSHA FEDERAL HAZARD COMMUNICATION STANDARD: OSHA has revised a federal communication standard which covers all employees exposed to hazardous chemicals, including asbestos. This standard requires both manufacturing and non-manufacturing employers to establish written hazard communication programs that

provide information about the chemicals to which the employees are exposed (Arbuckle, 1993:409).

DEPARTMENT OF TRANSPORTATION (DOT) REGULATIONS: The DOT regulates the transport of asbestos in accordance with the provisions of the Hazardous Materials Transportation Act (HMTA) of 1975. In 49 CFR 172, the DOT has designated asbestos as a hazardous material for the purposes of transportation and has prescribed requirements for manifesting, packaging, marking, labeling and transport vehicle placarding.

TABLE 2-3: Cross References To Asbestos Regulation (Federal Register, 1990:48433)

EPA: 40 CFR 763, Subpart E,F	Requires schools to inspect for asbestos and implement response actions and submit asbestos management plans to States. Specifies use of accredited inspectors, air sampling methods, and waste disposal procedures.
EPA: 40 CFR 427	Effluent standards for asbestos manufacturing source categories.
EPA: 40 CFR 763, Subpart G	Protects public employees performing asbestos abatement work in States not covered by OSHA asbestos standard.
OSHA: 29 CFR 1910.1001	Worker protection measures, engineering controls, worker training, labeling, respiratory protection, bagging of waste, 0.2 f/cc permissible exposure level.
OSHA: 29 CFR 1926.58	Worker protection measures for all construction work involving asbestos, including demolition and renovation - work practices, worker training, bagging of waste, 0.2 f/cc permissible exposure level.
MSHA: 30 CFR 56, Subpart D	Specifies exposure limits, engineering controls, and respiratory protection measures for workers in surface mines.
MSHA: 30 CFR 57, Subpart D	Specifies exposure limits, engineering controls, and respiratory protection measures for workers in underground mines.
DOT: 49 CFR 171 and 172	Regulates the transportation of asbestos-containing waste material. Requires waste containment and shipping papers.

REVIEW OF FEDERAL LIABILITY

The interpretation of existing regulations may result in a liability to the government for the less than optimal protection of asbestos abatement workers. A decision to follow the less stringent EPA standards for complete demolition projects with ACJC of 0.1 to 1.0 percent asbestos (Satterfield, 1993) may result in substandard protection of demolition workers. The following chapters of this research will attempt to determine if substandard worker protection exists on demolition work sites.

Whether or not adequate protection is afforded abatement workers, the United States Government may be liable for asbestos related injuries under the Federal Tort Claims Act and the Long Shoreman's and Harbor Worker's Compensation Act (BNA, 1987:93).

ASBESTOS ABATEMENT WORK PRACTICES

RENOVATION VS DEMOLITION: EPA and OSHA regulations treat renovation and demolition projects the same. Some Air Force Bases, however, use these terms to help delineate which regulations to follow, when the regulations seem vague. The standard practice on Wright-Patterson AFB is to abate material which contains greater than 1.0 percent asbestos (Leggen, 1994). Material with less than 1.0 percent asbestos is considered to contain only "trace" amounts, and is therefore demolished without engineering controls. McClellan AFB, however, follows the OSHA regulations when asbestos content is greater than 0.1 percent for renovation projects, or rather, whenever a facility is planned for re-use. If the building is being demolished, the less stringent EPA requirements are followed for any joint compound with an asbestos concentration between 0.1 and 1.0 percent. If the facility contains ACJC with greater than 1.0 percent asbestos and is scheduled for demolition, OSHA guidelines are followed.

The Base-by-Base adoption of differing interpretations of these regulations may present a future liability to the Government. If the Air Force is required to defend any

given interpretation in the future, it would be important to be able to show that there was a consensus on the regulation in question. If different Bases follow differing interpretations, it would indicate that some personnel were knowingly exposed to higher asbestos concentrations, ultimately limiting the protection of their health and welfare. This fact may cost the Government a great deal of money in the future, when improved technology and testing data will prove or disprove the overall carcinogenic impact of asbestos on the human body.

REPORTING REQUIREMENTS: Prior to abatement, it must be determined whether or not EPA notification is required. Per 40 CFR 61, the EPA requires a removal action notification in the following cases. When ACM is removed from:

> (i) at least 80 linear meters (260 linear feet) on pipe or at least 15 square meters (160 square feet) on other facility components, or
>
> (ii) at least one cubic meter (35 cubic feet) off facility components where the length or area could not be measured previously (EPA, 1990D:48421).

EMISSION CONTROL: Each owner or operator of a demolition or renovation activity shall remove all Regulated Asbestos Containing Material (RACM) from the facility being demolished or renovated before any activity begins that would breakup, dislodge, or similarly disturb the material or preclude access to the material for subsequent removal. According to 40 CFR 61, RACM need not be removed before demolition if (EPA, 1990D:48421):

> (i) It is a Category I non-friable ACM that is not in poor condition and is not friable.
>
> (ii) It is on a facility component that is encased in concrete or other similarly hard material and is adequately wet whenever exposed during demolition, or
>
> (iii) It is not accessible for testing and was, therefore, not discovered until after demolition began and, as a result of the demolition, the material cannot be safely removed. If not removed for safety reasons, the exposed RACM and any asbestos-contaminated debris must be treated as asbestos-containing waste material and be adequately wet at all times during disposal.

(iv) They are Category II non-friable ACM and the probability is low that the material will become crumbled, pulverized, or reduced to powder during demolition.

BULK SAMPLE ANALYSIS: To determine if a material is asbestos-containing, bulk samples must be obtained. 40 CFR 763.86 requires that bulk samples be collected by an accredited inspector in a statistically random manner that is representative of the homogenous area of surfacing material. The regulation directs that the samples be collected as follows:

(1) At least three bulk samples shall be collected from each homogenous area that is 1000 ft^2 or less, except as provided in 763.87(c)(2).

(2) At least five bulk samples shall be collected from each homogenous area that is greater than 5000 ft^2, except as provided in 763.87(c)(2).

(3) At least seven bulk samples shall be collected from each homogenous area that is greater than 5000 ft^2, except as provided in 763.87(c)(2).

Quality Control (QC): Collection of side-by-side duplicate samples are recommended at a rate of one QC sample per building or one QC sample per twenty samples, whichever is larger. The laboratory should analyze duplicates without knowing which are the QC samples. The results of the duplicates are compared to determine the sampling and analytical precision(EPA, 1990D:8-5).

ABATEMENT: Each abatement project has its own unique characteristics, but each requires several things: a continued analysis of the worksite for ACM, worker protection during the project, a properly contained area, ACM removal, and a rigorous post abatement cleanup effort (Environmental Institute, 1991:5-1).

The continued analysis for hidden ACM is required to ensure that all ACM has been identified, and to also ensure that none of the material is improperly removed. Often, a second round of sampling is conducted on select areas of the project to better delineate areas requiring further abatement actions.

Worker protection entails not only proper training and specified work practices per 29 CFR 1910 and 1926, but also protective equipment for abatement workers. The OSHA standards specify three different respirators depending on the expected concentration of fibers in the work area: (1) a full or half-faced mask with either a single-use or replaceable filter, (2) a full-face mask with replaceable filter and a pump to assist breathing, and (3) a full-face mask with self-contained or remote air supply (Environmental Institute, 1991:5-1). NIOSH now recommends that the first type of mask not be used with a single-use filter. This is because the filters have not been tested for effectiveness specifically against asbestos fibers and because they are difficult to seal against the face (Environmental Institute, 1991:65). Further information on worker protection and environmental controls can be found in the EPA document, A Guide to Respiratory Protection for the Asbestos Abatement Industry (EPA, 1986A).

The proper containment of the abatement work area requires the construction of barriers with 6 mil polyethylene plastic sheets joined with folded seams, and with sealing tape at the seams and boundaries. Air locks, decontamination rooms, and negative air systems are suggested, but not always required (Environmental Institute, 1991:5-3). Detailed instructions for the construction of containment systems can be found in the referenced documents, Environmental Institute, 1991; EPA, 1979A; and EPA, 1986A.

The actual removal effort can be conducted in several different manners, the most common being full or glovebag containment. In either case, the material must first be treated with a solution of water and a wetting agent to reduce fiber release. Some types of amosite will not absorb either water or water combined with the wetting agent, usually 50% polyoxyethylene ester and 50% polyoxyethylene ether as suggested by the EPA (Environmental Institute, 1991:5-3). A wetting agent must be used. The EPA must approve all dry removal operations, as required under NESHAPS, 40 CFR 61.

A rigorous post-abatement cleanup effort is required to ensure the area is not left in a contaminated condition. Cleanup should include wet mopping or HEPA-vacuuming

of all horizontal and vertical surfaces in the abatement area. A second cleaning at least 24 hours after the first is highly suggested in order to remove fibers that have had time to settle (Environmental Institute, 1991:5-3).

IN-HOUSE VS CONTRACT ASBESTOS REMOVAL

Some requirements of the construction industry asbestos standard apply whenever various types of work are performed involving ACJC or other asbestos containing materials regardless of the asbestos content. The scope of this research involves demolition, renovation and alteration projects which do fall under the purview of the Construction Industry and General Industry Standards. For further information, the reader is directed to 29 CFR 1926.58(a) for a summary of regulated activities (Clark, 1993:1)

CONCLUSION

The Air Force is currently using two differing regulatory guidance documents which directly impact the health and welfare of the asbestos abatement workforce (Carl, 1993; Satterfield, 1993). It is difficult to choose the safest and most cost effective action level to follow because of the differing regulatory agency requirements. Standardized methods for the analysis and interpretation of ACM test results are required to successfully mesh the EPA and OSHA requirements.

In the following chapters, a methodology will be developed and proposed to determine the appropriate action level to follow during the abatement of ACJC. This action level will ultimately result in the least amount of money spent for the adequate protection of the asbestos abatement workforce.

III. RESEARCH METHOD

INTRODUCTION

The EPA and OSHA regulations for asbestos abatement activities are interpreted different ways by different Air Force Bases. The determination of whether or not adequate protection is being afforded abatement workers, as well as workers occupying the area after abatement, needs to be determined.

This research will provide a decision-making tool to help evaluate the most efficient action level which protects the safety of asbestos abatement workers while also minimizing abatement costs. This chapter will describe the variables, model, model output, and assumptions used.

DETERMINATION OF VARIABLES

Many variables will be used to describe the specific conditions under which removal of ACJC will take place. As described below, some variables will be definitive quantities, such as the dimensions of a room. Other variables, such as the room air exchange rate, will be computer simulated. During the computer simulation, a random number generator will be used to produce a column of variables within the predetermined range, using a uniform probability distribution. The simulation model will represent the environmental conditions present during the removal of ACJC. These conditions can be modeled by use of the following variables:

1. Cubic footage of room or enclosure
2. Wall area within room or enclosure
3. Percent asbestos in ACJC
4. Demolition rate in square feet per hour
5. ACJC application rate
6. Standard fiber volume
7. Number of asbestos fibers present in wall(s)
8. Fraction of sheetrock pulverized
9. Number of fibers released per hour
10. Air exchange rate of room during demolition
11. Number of fibers present in air at any instant in time (t)
12. Average number of fibers per cubic centimeter during demolition

CUBIC FOOTAGE: The cubic footage of a room will be entered as the actual volume, in cubic feet, as measured for a given project. Due to the change in air volume, if a demolition facility has more than one room, each room will be modeled separately. The spreadsheet program will automatically convert cubic footage to cubic centimeters as required to produce consistent units in spreadsheet computations.

WALL AREA: The wall area within the enclosure will be entered in square feet, as measured for each individual room or enclosure. The spreadsheet program will convert square feet to square centimeters as required to produce consistent units in spreadsheet computations.

PERCENT ASBESTOS IN ACJC: This model is designed for projects where sample results for bulk sheetrock analyses return an asbestos content in the range of 0.10 to 0.90 percent as measured by TEM. The spreadsheet tables will have columns which are calculated with asbestos concentrations from 0.10 to 0.90 percent in 0.1 increments.

DEMOLITION RATE: The average demolition rate of 100 SF/Hr is the industry standard for cost estimate calculations (Means, 1988:22). This rate assumes a two person crew, working eight hours per day. This rate does not account for break periods, but assumes a continual demolition process. The rate of 100 SF/Hr is used as a constant in all spreadsheet calculations. This research covers manual demolition techniques only, and does not include radical demolition techniques such as those involving bull dozer and wrecking-ball equipment.

ACJC APPLICATION RATE: The average amount of ACJC that is applied during construction is 3 gallons per 500 square feet of wall space (Falcone, 1978: 321). This amount is used in the construction industry for construction cost estimation, and will be used as a constant in this research.

STANDARD FIBER VOLUME: The conventional industrial hygiene definition of an asbestos fiber describes a fiber as having a length greater than 5 μm, an aspect ratio greater than 3 to 1, and a diameter less than 3 μm. This definition gives rise to a range of

fibers from 5 μm to 9 μm in length. To determine the number of fibers in an average sample of ACJC, an even distribution of fibers with lengths of 5, 6, 7, 8, and 9 micrometers will be used. These fibers will each be assumed to have an aspect ratio of 3 to 1. As shown in Chapter 4 calculations, the total volume of the five fibers described above is $1.68 * 10^{-10}$ cubic centimeters. This number will be used as a constant in spreadsheet calculations.

NUMBER OF FIBERS IN WALL: No published data is available to describe the fiber size ratios within a specific ACM. As described above, for the purpose of this research, fiber concentrations will be assumed to have lengths normally distributed, all having an aspect ratio of 3:1. The lowest aspect ratio within the fiber definition, 3:1, presents the most conservative estimate of fiber availability for exposure, and thus, the most conservative estimate in terms of protecting worker health and safety. The number of fibers in the wall system is found by multiplying the amount of joint compound used on the wall system by the percent content of asbestos, dividing by the standard fiber volume, and then multiplying this amount by five to get the total number of fibers. For sample calculations, see Chapter 4.

FRACTION OF SHEETROCK PULVERIZED: The percent of sheetrock which becomes friable will be assumed to range from 30% to 70%. This range represents the percent of sheetrock which becomes pulverized, and thus potentially airborne during demolition work. This range is a conservative estimate taking into account the stringent definition of friability. Any material is considered friable if it is disturbed in a way such that it becomes airborne. The 70% figure is a conservative figure which over approximates the destruction that would normally occur during hand-removal. If demolition work was accomplished by heavy machinery such as a bull dozer, an upper limit of 100% would be assumed, indicating that all fibers become airborne during demolition.

NUMBER OF FIBERS RELEASED PER HOUR: The number of fibers released per hour is calculated from the total number of fibers becoming airborne during demolition divided by the demolition rate and air exchange rate. The number of fibers released per hour is then used to calculate the average number of fibers per cubic centimeter of air during demolition. Example calculations are shown in Chapter 4.

AIR EXCHANGE RATE: The normal non mechanical air exchange rate for a building built prior to 1970 is from 0.7 to 1.5 changes per hour (EPH) (Morrill, 1989:8). The non-mechanical exchange rate is used because the electrical power to demolition buildings is normally disconnected prior to demolition work. This would disable any heating or ventilation equipment normally used to improve airflow throughout the structure. The exchange rate will be used to quantify the levels of exposure which will be somewhat less if airflow is able to reduce airborne concentrations in the area of demolition.

This research will consider only single rooms, and will assume the air exchange rate to represent an exchange with outside ambient air. This assumption overlooks the possibility of build-up of asbestos fiber concentrations outside the immediate area of demolition. This must be taken into account on each individual project, insuring that adequate ventilation is available in the work area.

Air Exchange Rates will be obtained through random computer generation using a uniform distribution. This distribution is used with the assumption that any exchange rate within the 0.7 to 1.5 range is equally likely to occur. It may be prudent to further analyze the air exchange situations on individual projects to justify this assumption.

NUMBER OF FIBERS IN AIR: The number of fibers released into the air is calculated from the number of fibers released divided by the air exchange rate and the duration of the demolition work. Example calculations are shown in Chapter 4.

AVERAGE NUMBER OF FIBERS PER CC: The number of fibers present per cubic centimeter of air is found by dividing the average number of fibers in the air during

demolition activities divided by the total volume of the room in cubic centimeters. Again, example calculations are shown in Chapter 4 of this work.

MONTE CARLO COMPUTER SIMULATION

The computer model simulation is comprised of a spreadsheet which is assembled with random number generation capability. The random number generation will be limited to ranges and distributions as discussed under each given variable. The computer simulation will be run using ten different room sizes. Each simulation will include calculations for the range of asbestos concentration of 0.10 to 0.90 % in 0.1 increments. The results from these spreadsheets will produce a graphic representation of the exposures experienced by demolition workers.

MODEL OUTPUT

Each spreadsheet, representing a specific room size, will have its resulting data plotted. The graph shows the number of asbestos fibers per cubic centimeter versus the percent of asbestos in the ACJC.

NON VARIABLE-SPECIFIC ASSUMPTIONS

ACJC THICKNESS: The application of joint compound is somewhat uniform, but in an effort to produce an even smooth surface, the compound is applied in various thicknesses. The application of joint compound fills in the cracks and irregularities of the sheetrock, and is subsequently covered up by surfacing materials such as paint and/or wallpaper.

The range of thickness of joint compound is usually from zero to 1/4th inch. This range in thickness may lead to an exposure scenario which might not be adequately characterized by an "average" exposure over the duration of the demolition work.

IV: SPREADSHEET MODEL

EXAMPLE SPREADSHEET

The spreadsheets used in this research were created on Microsoft Excel. The organization and entry of data required for the spreadsheet calculations are described in this chapter.

The following spreadsheet is an abbreviated example of those used in this research. The example is comprised of ten iterative lines which are used to compute the average number of fibers present in the air during a specific demolition project. The actual spreadsheets which can be found in Appendix A use 200 iterative lines. When using a Monte Carlo simulation, the higher the number of iterations, the better the approximation. In this research, the attempt is being made to approximate the total number of fibers per cubic centimeter to which asbestos abatement workers are exposed. Theoretically, the greater the number of iterations the closer the outcome will be to the actual fiber count.

The example spreadsheet is explained below. The capitalized letters at the beginning of each of the following variable descriptions correspond to those on the example spreadsheet found on Table 4-1. The following paragraphs describe the methods used to calculate the spreadsheet.

A. Dimensions of the Room: The dimensions of the room are entered as text in this cell. This cell is not used for computation, it simply indicates the size of the room for the current spreadsheet calculation.

B. Cubic Footage of Room: The cubic footage of the room is entered as a mathematical equation, providing the cubic footage in numerical form. This equation is a

TABLE 4-1: EXAMPLE SPREADSHEET

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 15' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES			CALCULATIONS FROM INPUT VARIABLES		
A	15*25*8	Dimensions of Room (Ft)	F	84960000	Room Volume in Cubic Centimeters
B	3000	Cubic Footage of Room	G	579231.5	Wall Area in Room in Square Centimeters
C	623.5	Wall Area of Room (Sq FT)	H	92900	Demo Rate in Square Centimeters per hour
D	100	Demolition Rate (Sq Ft/Hr)	I	6.235	Total Time to Demolish (hr)
E	3	ACJC Application Rate (gal/500 Sq Ft of wall)	J	3.741	Gallons of ACJC Applied to Walls
			K	14159.685	Cubic Centimeters of ACJC Applied to Walls
			L	1.68E-10	Fiber Volume within ACJC, Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc).

M	N	O...								
Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.40	0.79	404.0	808.0	1212.1	1616.1	2020.1	2424.1	2828.2	3232.2	3636.2
0.58	1.23	374.4	748.8	1123.2	1497.6	1871.9	2246.3	2620.7	2995.1	3369.5
0.63	0.88	567.9	1135.9	1703.8	2271.8	2839.7	3407.6	3975.6	4543.5	5111.5
0.62	1.36	366.5	733.0	1099.4	1465.9	1832.4	2198.9	2565.4	2931.9	3298.3
0.83	0.74	893.5	1787.1	2680.6	3574.2	4467.7	5361.2	6254.8	7148.3	8041.9
0.48	0.86	441.9	883.8	1325.6	1767.5	2209.4	2651.3	3093.2	3535.0	3976.9
0.43	0.76	450.2	900.4	1350.7	1800.9	2251.1	2701.3	3151.5	3601.7	4052.0
0.61	1.10	438.0	875.9	1313.9	1751.9	2189.8	2627.8	3065.8	3503.7	3941.7
0.64	1.17	433.3	866.6	1299.9	1733.2	2166.5	2599.8	3033.1	3466.4	3899.7
0.61	0.80	613.6	1227.2	1840.7	2454.3	3067.9	3681.5	4295.1	4908.6	5522.2
P	AVERAGES:	498.3	996.7	1495.0	1993.3	2491.7	2990.0	3488.3	3986.7	4485.0

computation of the formula described in A above. This cell is used in spreadsheet calculations.

C. Wall Area of Room: The wall area is entered as a mathematical equation to produce a numerical output in square feet. This cell is used by reference for spreadsheet calculation. The calculations for all spreadsheets included the gross wall area minus the area of one door. No window areas were subtracted from the total wall area, thus providing a more conservative estimate of asbestos fiber exposure.

D. Demolition Rate: The rate of 100 SF/Hr (Means, 1989:22) is assumed to be constant, and is entered as such. The cell is used in calculations by reference.

E. ACJC Application Rate: The application of joint compound is assumed to be a constant 3 gallons per 500 square feet of wall (Falcone, 1978:321). This is entered into the cell as a constant and is used in calculations by reference.

F. Room Volume in Cubic Centimeters: The value in this cell is the result of the following calculation:

$$3000 \text{ CF} * (28320 \text{ CC/CF}) = 84{,}960{,}000 \text{ CC}$$

G. Wall Area: This value is a conversion of units as shown in the following equation:

$$640 \text{ SF} * 929 \text{ SC/SF} = 594{,}560$$

H. Demolition Rate in Square Centimeters per Hour (SC/Hr): This is a conversion of units shown in the following equation:

$$100 \text{ SF/Hr} * 929 \text{ SC/SF} = 92{,}900 \text{ SC}$$

I. Total Time to Demolish: This is the total time expected to demolish the sheetrock walls in the room in question. The project duration is found as shown in the following calculation: (640 SF of Wall)/(100 SF/Hr) = 6.4 Hrs

J. Gallons of ACJC Applied to Walls: To determine the number of gallons that have been applied to the walls within the room in question, the calculation is as follows:

640 SF of Wall * (gallons / 500 SF) = 3.84 gallons

K. Cubic Centimeters of ACJC Applied to Walls: This is a conversion of gallons of ACJC to cubic centimeters of ACJC. The conversion is conducted as follows:

3.84 gallons ACJC * 3785 cc/gal = 14,534.4 cc

L. Fiber Volume Within ACJC: This volume is based on the assumption that the asbestos concentration within the ACJC consists of an even number of fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1. This assumption is taken from the conventional industrial hygiene definition of an asbestos fiber which describes a fiber as having a length greater than 5 μm, an aspect ratio greater than 3 to 1, and a diameter less than 3 μm. To stay within these guidelines, fibers can only have the five lengths listed above while also having a 3 to 1 aspect ratio. Below is a table which shows the range of fiber lengths and diameters within the industrial hygiene definition of a fiber.

Table 4-1: Particle Dimensions Which Fall Within Definition of a Fiber

FIBER LENGTH (μm)	ASPECT RATIO (Unitless)	DIAMETER (μm)
5	3:1	1.67
6	3:1	2.0
7	3:1	2.33
8	3:1	2.67
9	3:1	3.0

The industrial hygiene definition of a fiber allows for a fiber to have an aspect ratio greater than 3 to 1, however, to provide the most conservative estimate of exposure to asbestos abatement workers, a 3 to 1 aspect ratio is assumed for all fibers within the ACJC. This estimate is more conservative because a lower aspect ratio results in more fibers per volume of ACJC. The following calculation is used to determine the volume of a set of five fibers with the lengths and diameters listed in the above table. The calculated volume can then be used in spreadsheet calculations to compute the total number of fibers potentially released during demolition activities. This assumption was used due to a lack of literature indicating the distribution of fiber lengths within the ACJC material. The generic equation is as follows:

$$\sum\left[Fiber\ Length * \pi(Diameter)^2 / 4\right]$$

OR

$$\sum_{L=5\mu m}^{9\mu m}\left[Fiber\ Length * \pi(Fiber\ Length/3)^2 / 4\right]$$

The calculation of the volume in cubic centimeters of the five fibers described above is as follows:

$$(0.0005\ cm * ((0.0005\ cm/3)^2/4) * \pi + (0.0006\ cm * ((0.0006\ cm/3)^2/4) * \pi +$$

$$(0.0007\ cm * ((0.0007\ cm/3)^2/4) * \pi + (0.0008\ cm * ((0.0008\ cm/3)^2/4) * \pi +$$

$$(0.0009\ cm * ((0.0009\ cm/3)^2/4) * \pi = 1.68 * 10^{-10}\ cc$$

The above equation is simply the sum of the volumes of the different fibers. Note that 5 μm is equivalent to 0.0005 cm. The first term represents the 0.0005 cm length multiplied by the cross-sectional area of the fiber. This area is found by the equation for

the area of a circle, $\pi * D^2/4$. The length of the fiber is divided by three to calculate the diameter, this being required to obtain a 3 to 1 ratio.

M. Fraction of Sheetrock Pulverized: This column contains numbers in the range of 0.30 to 0.70. These numbers are obtained by a random computer generation of a uniform distribution of numbers within this range. The numbers within this range indicate the percentage of sheetrock that is pulverized during demolition. This column is identical for all fiber per cubic centimeter calculations, as well as for all of the spreadsheets used in this research. This enables a direct comparison of values from one set to another.

N. Air Exchange Rate (EPH): The air exchanges per hour fall within a range of 0.7 to 1.5 exchanges per hour. Again, the column of numbers are computer generated using this range and a uniform distribution. The air exchange rate column is identical for fiber per cubic centimeter calculations, as well as for the additional spreadsheets.

O. Asbestos Content of 0.10% , Fibers per cc: This calculation uses many of the above variables to determine the number of fibers within any cubic centimeter of air within the room during demolition. The calculation is as follows:

$$\frac{[\%\,Asbestos\ in\ ACJC * Volume\ of\ ACJC\,(cc/fiber) * 5\ Fibers\ per\ Set * Fraction\,Sheetrock\ Pulverized]}{[\ Fiber\,Volume\,(cc/fiber) * Demo\ Duration(hr) * Air\ Exchange\ Rate\,(Exchanges/hr) * Room\ Volume\ (cc)\ ]} =$$

$$= Number\ of\ Fibers\ per\ cc$$

or, numerically from the first line of the example spreadsheet

$$\frac{0.001 * 14534.4\ cc\ ACJC * 5\ fibers * 0.40}{(1.68*10^{-10}\ cc/fiber) * (6.235\ hrs) * (0.79/hour) * (84,960,000\ cc) * (0.40)} =$$

$$= 404.0\ Fibers\ per\ cc\ of\ Room\ Air$$

P. Averages: The fiber counts are averaged in each column of the spreadsheets. These averages represent the approximate exposure experienced by an asbestos abatement worker in number of fibers per cubic centimeter of air. The actual spreadsheet columns include 200 values which are averaged to approximate the possible exposure episode.

These averaged values can be directly compared to the OSHA action level of 1 fiber per cubic centimeter of air. A review of these numbers show an exceedance above and beyond the OSHA action level by a factor of 100 to 1000.

JUSTIFICATION OF VARIABLE ASSUMPTIONS

Air Exchange Rate, Fiber Volume, Fraction of Sheetrock Pulverized, and Wall Area variables were developed with assumptions that require further clarification. These variables require further analysis to determine if their variation would substantially change the model outcome.

As shown on Table 4-4, as well as in the spreadsheets contained in Appendix B, the exposure calculations show that for all of the room sizes, exposures exceed the OSHA action limit of 0.1 fiber per cubic centimeter of air. This outcome depends upon assumptions which, if changed, could bring about a different conclusion. Therefore, to ensure that the spreadsheets in the Appendix were calculated with adequately conservative ranges for Air Exchange Rate, Fiber Volume, and Fraction of Sheetrock Pulverized variables, Table 4-3 was prepared.

Air Exchange Rate: Instead of using random variables for the air exchange rate and percentage of pulverization, Section A of the table was calculated with the maximum assumed air exchange rate of 1.5 exchanges per hour and the minimum pulverization percentage of 30 percent. Maximizing the air exchange rate and minimizing the percent pulverization, the outcome will represent the minimum exposure expected in the given room dimensions. The largest of the room dimensions were used to maximize the volume which contains the released asbestos fibers, therefore, providing the minimum exposure concentration that might be expected.

The results in Section A of Table 4-3 show an exceedance of the OSHA 0.1 f/cc action level for all ACJC asbestos content percentage levels. All of these spreadsheet calculations result in possible airborne asbestos exposures which would dictate containment procedures during abatement actions.

Fiber Volume: Table 4-3, Sections B and C, show spreadsheet calculations of the extreme minimum and maximum values for Fiber Volume while still adhering to the Industrial Hygienists definition of a fiber. Instead of using the volume of a set of fibers with lengths of 5, 6, 7, 8, and 9 micrometers, the spreadsheet is calculated twice, once with the assumption that all fibers are 5μ in length and once with all fibers being 9μ in length. The intent of this analysis is to show whether or not the spreadsheet outcome can be changed simply by altering the assumptions concerning fiber size distributions. When a fiber volume is used which assumes all fibers to be 5 micrometers in length, the number of fibers available for release is maximized. The calculation involving the 9μ fibers is used

to show the other extreme, that being the minimum number of fibers present in the ACJC, given that they all still fall under the industrial hygienists definition of a fiber.

All other variables are held constant in these two calculations. Out of all of the room sizes that were used in the analysis model, the largest room size was used in this calculation to maximize the volume with which the fibers may become disseminated. Maximizing the air exchange rate and minimizing the percent pulverization results in the lowest exposure expected for the given room dimensions.

As can be seen in Table 4-3, the variance of the Fiber Volume shows a large change in fiber per cubic centimeter concentrations. This variation, however, does not result in concentrations low enough to change the original outcome, that being the exceedance of OSHA permissible exposure limits. The maximum and minimum exposures shown in Table 4-3 are 330.8 and 6.3 fibers per cc from the 5μ and 9μ calculations respectively.

This analysis indicates that the Fiber Volume variable is not sensitive enough to change the outcome of this research when considering fibers within the range of concern, those between 5 and 9 micrometers in length with a 3 to 1 aspect ratio.

Fraction of Sheetrock Pulverized: The model assumes a range of 0.30 to 0.70 for the fraction of sheetrock pulverization. Intuitively, these parameters may seem highly conservative. The percent of sheetrock that becomes pulverized is dependent upon factors such as the tools used, the speed of removal, the number of nails holding the sheetrock in

TABLE 4-3: ANALYSIS OF ASSUMED VARIABLES

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 200' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
200*25*8	Dimensions of Room (Ft)	1132800000	Room Volume in Cubic Centimeters
40000	Cubic Footage of Room	3329071.5	Wall Area in Room in Square Centimeters
3583.5	Wall Area of Room (Sq FT)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	35.835	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft of wall)	21.501	Gallons of ACJC Applied to Walls
		81381.285	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume of fibers 6,6,7,8, and 9 micrometers in length, 3 to 1 aspect ratio
		1.09E-11	Fiber Volume of one fiber 5 micrometers in length with a 3 to 1 aspect ratio
		6.36E-11	Fiber Volume of one fiber 9 micrometers in length with a 3 to 1 aspect ratio

Section A: Air Exchange Rate Variable Analysis

Calculations using an assumption of equal distribution of fibers 5,6,7,8, and 9 micrometers in length with a 3 to 1 aspect ratio

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.30	1.50	11.9	23.9	35.8	47.7	59.7	71.6	83.5	95.5	107.4

Section B: Fiber Volume Variable Analysis

Calculations using an assumption of all fibers being 5 micrometers in length with a 3 to 1 aspect ratio

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.30	1.50	36.8	73.5	110.3	147.0	183.8	220.5	257.3	294.1	330.8

Section C: Fiber Volume Variable Analysis

Calculations using an assumption of all fibers being 9 micrometers in length with a 3 to 1 aspect ratio

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.30	1.50	6.3	12.6	18.9	25.2	31.5	37.8	44.1	50.4	56.7

Section D: Fraction of Pulverization Variable Analysis

Calculations using an assumption of all fibers being 9 micrometers in length with a 3 to 1 aspect ratio and the pulverization reduced to 5 percent.

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.05	1.50	1.1	2.1	3.2	4.2	5.3	6.3	7.4	8.4	9.5

place, and the paint or wallpaper material covering the sheetrock surface. The percent pulverization may vary greatly, and as such, a conservative range was used.

Section D of Table 4-3, was prepared for the purpose of showing the affect that a change in this variable would have on the outcome of this research. Again, the air exchange rate was left at 1.5 exchanges per hour to minimize the affect that this variable might have on the computation of the exposure concentration. The largest room size was used in this calculation to maximize the volume with which the fibers may become disseminated, thus also minimizing the affect that room size might have the on calculation of exposure concentration. This calculation also considers all fibers to be 9 μm in length, thus also minimizing the impact that fiber size might have on the outcome of this calculation.

As can be seen in Table 4-3, the lowest calculated exposure concentration was 1.1 f/cc. This was calculated using a constant 5 percent pulverization, which is not conservative when considering the potential for sheetrock destruction during removal. The 1.1 f/cc result is still in excess of the 0.2 f/cc permissible exposure limit set by OSHA standards.

This analysis indicates that the Fraction of Sheetrock Pulverization variable is not sensitive enough to change the outcome of this research when considering fibers within the range of concern, those between 5 and 9 micrometers in length with a 3 to 1 aspect ratio.

Wall Area: Wall area was the only asbestos containing material considered in this analysis. There does exist the possibility that ACJC might be present in ceiling materials

as well. This model does not take these ceiling materials into account. The analysis of the modeled exposure concentrations suggest that this would be a moot point, considering all of the exposure results exceeded the OSHA PEL standards without ceiling material consideration. If ceiling materials do contain asbestos, the exposure concentrations would be greater, and thus there would be no change in the requirement for abating the material under containment conditions.

GRAPHING SPREADSHEET OUTPUT

A complete set of spreadsheets can be found in the Appendix B of this text. Table 4-4 below contains the average for each column of data shown in each spreadsheet. The averages can be found in the last line of each spreadsheet in Appendix B.

TABLE 4-4: AVERAGE FIBER COUNTS FROM SPREADSHEET CALCULATIONS

Room Size	Percent Asbestos in ACJC								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
15*25*8	499	998	1497	1996	2495	2994	3493	3992	4491
20*25*8	374	748	1123	1497	1871	2245	2620	2994	3368
25*25*8	299	599	898	1197	1497	1796	2096	2395	2694
30*25*8	249	499	748	998	1247	1497	1746	1996	2245
35*25*8	214	428	642	855	1069	1283	1497	1711	1925
40*25*8	187	374	561	748	936	1123	1310	1497	1684
45*25*8	166	333	499	665	832	998	1164	1331	1497
50*25*8	150	299	449	599	748	898	1048	1197	1347
60*25*8	125	249	374	499	624	748	873	998	1123
70*25*8	107	214	321	428	535	642	748	855	962
125*25*8	60	120	180	239	299	359	419	479	539
200*25*8	37	75	112	150	187	225	262	299	337

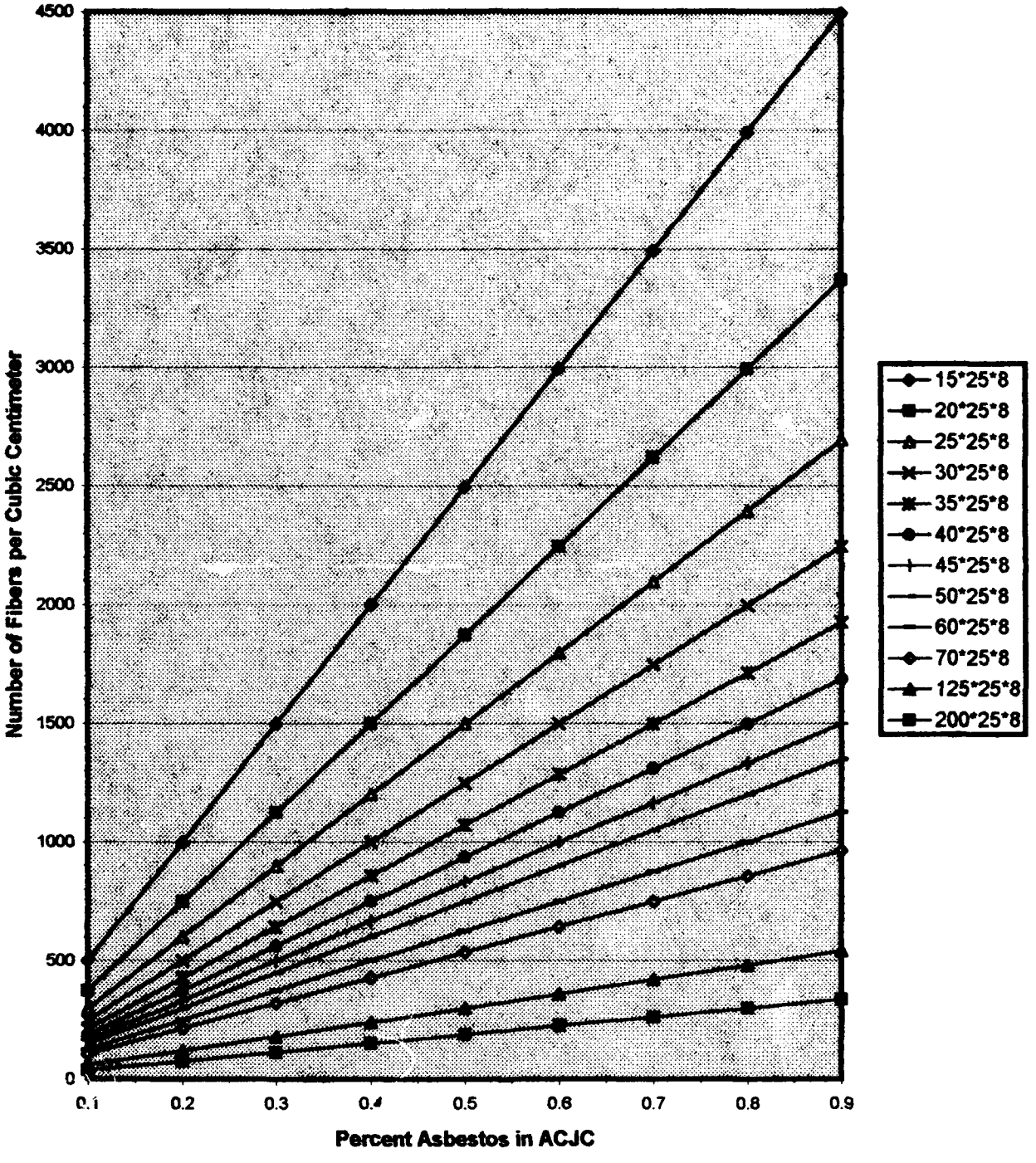
The above averaged numbers are multiples of one another, from left to right in any given row. This results from the linearity of the spreadsheet equations and from the repetitive use of the computer generated random numbers in the first two columns of the

spreadsheets. Due to the linearity of the above numbers, intermediate exposure concentrations can be extrapolated from the above table.

The following page contains a graph of the data in Table 4-4. Again, the linearity is obvious, but more importantly, the relationship between room size, exposure concentration, and initial asbestos content of the ACM become more clear in a graphical representation such as this.

FIGURE 4-1

Asbestos Exposure: Room Size vs. ACJC Asbestos Content



V. CONCLUSIONS AND RECOMMENDATIONS

EPA GUIDANCE

Since the spreadsheet calculations result in an overwhelming indication of the possibility of the exceedance of the Permissible Exposure Limit (PEL), OSHA regulations become binding. EPA regulations however, do not state any requirements for removal actions involving materials with less than 1.0 percent asbestos. The regulations that an employer must follow regarding material with an asbestos content of less than 1.0 percent are related to worker health, and thus are dictated by the OSHA.

SUPPORT FOR OSHA GUIDANCE

The assumptions in this research are conservative, leading to a possible interpretation that all ACJC abatement actions result in exposure levels above the OSHA permissible exposure limit. The intent of this research was to show whether or not exposures in excess of 0.2 f/cc were possible. Having shown that excessive exposure episodes are possible, the protocol for the handling of ACJC abatement actions must be addressed.

As indicated in Chapter 2, OSHA requires that every employer perform initial monitoring of employees who are or may be exposed at or above the action level of 0.1 f/cc (Cherry, 1988:153). Once the PEL of 0.2 f/cc is reached, personal protective equipment (PPE) is required to limit the exposure to a maximum of 0.1 f/cc per 29 CFR Part 1926.58.

Since the action level was exceeded in spreadsheet calculations by factors of three to five orders of magnitude, the following precautions are suggested as a measure to

protect the health and safety of demolition workers. If objective testing data is acquired which confirms the exceedance of the PEL, the following measures would become mandatory under OSHA guidance found in 29 CFR Part 1926.58.

- Provide worker education and training concerning asbestos hazards
- Provide engineering controls where feasible
- Provide personal monitoring if exposure exceeds 0.1 f/cc
- Provide personal protective equipment if exposure exceeds 0.2 f/cc
- Post warning labels and signs
- Retain worker medical records for 30 years
- Provide changing rooms, showers, etc.
- Provide clean areas to eat, drink, etc.

REGULATIONS TO FOLLOW: AVAILABLE OPTIONS

The intent of this research was to provide options which could be suggested for implementation during ACJC removal operations. Minimum requirements must be followed when demolition wallboard is identified as asbestos-containing. The following Table summarizes the options available to the government. The most conservative option is the adherence to OSHA regulatory guidelines.

Table 5-1: ACJC REMOVAL OPTIONS

FOLLOW EPA GUIDANCE	FOLLOW OSHA GUIDANCE	FOLLOW EPA & OSHA GUIDANCE	DO NOTHING OPTION
Analyze material. If material contains greater than 1.0 percent asbestos by area, continue guidance below.	Analyze material for asbestos content. If any detectable level is found throughout the material, initiate monitoring	Analyze material for asbestos content. If any detectable level is found throughout the material, initiate monitoring.	It would not be prudent to "do nothing". Monitoring of airborne asbestos should be accomplished at a minimum.
Notify EPA of removal action if quantity affected is greater than 260 linear feet or 160 SF	At the time of this writing, there are no OSHA reporting requirements for abatement projects	Notify EPA of removal action if quantity affected is greater than 260 linear feet or 160 SF	If concentrations are below test detection limits, demolish as normal non-asbestos debris.
Contain area if asbestos content is greater than 1.0 percent	If exposure level reaches 0.1 f/cc the following must occur: - Employee training - Medical surveillance	If exposure level reaches 0.1 f/cc the following must occur: - Employee training - Medical surveillance	If monitoring indicates an airborne concentration greater than 0.1f/cc, follow OSHA guidance at a minimum.
Dispose of ACM if asbestos content exceeds 1 percent	Monitor air for concentrations greater than PEL of 0.2f/cc Dispose of all ACJC material as asbestos containing waste Use warning labels and signs where applicable Retain medical records for 10 years	Monitor air for concentrations greater than PEL of 0.2f/cc Dispose of all ACJC material as asbestos containing waste Use warning labels and signs where applicable Retain medical records for 10 years	

MINIMIZING HEALTH RISKS

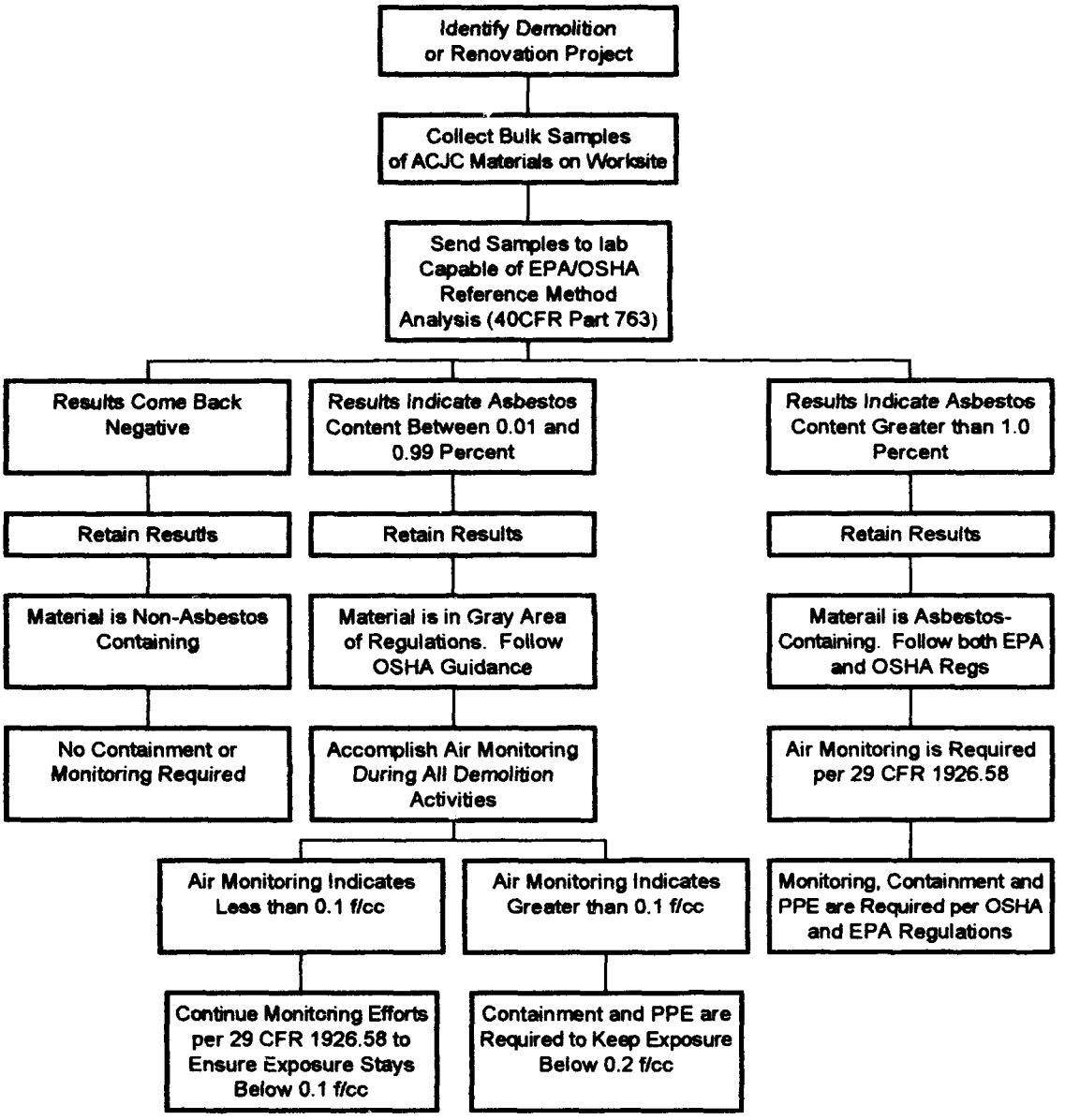
The minimization of health risk can only be achieved if regulations are interpreted and followed correctly. OSHA regulations are more stringent than those of the EPA, specifically because they are in place to protect the health and safety of those persons who experience exposure on a daily basis, the asbestos abatement and/or demolition work force. It should be noted that the OSHA action and permissible exposure levels are designed to be overly conservative until researchers are able to quantify a definitive health risk associated with each form of asbestos as well as the hazards associated with different levels of exposure. The action and permissible exposure levels may be changed in the future if additional knowledge becomes available on the potential health risks associated with airborne asbestos exposure.

Preventing exposure is the best way to minimize the adverse health effects associated with ACJC removal. The best defense against the potential liabilities associated with exposure and the subsequent health effects would be for the Air Force to adhere to OSHA guidance when dealing with material containing any detectable level of asbestos.

ABATEMENT PROJECT PROTOCOL:

The results of spreadsheet calculations indicate a need to test for airborne asbestos in all instances where materials containing asbestos are going to become friable. The following Figure shows the suggested protocol for the management of such projects.

FIGURE: 5-1 Flow Chart for Determination of Abatement Protocol



The collection of bulk samples is a critical step in the process of identifying ACJC. When samples are collected, every effort must be made to collect samples which reflect the wall system as a whole. Bulk samples should be collected at the intersection of two sheetrock boards. ACJC, if applied to the wall, will be thickest at these joints. Since ACJC is applied over most of the surface area of the wallboard, most samples will include a small amount of ACJC. During laboratory examination, analysis methods are used to identify the different components of the wall material, thus a discrete analysis of the specific component can be achieved.

RENOVATION vs. DEMOLITION

This research provides no reason to treat demolition and renovation projects differently if work is performed manually. McClellan Air Force Base, the installation applying the most stringent protocol, treats demolition and renovation projects separately. This is done because the demolition of facilities is not accomplished by hand, but is performed externally, such as by bull dozer. Although this interpretation may adequately protect the demolition workers because they are not enclosed in a room with contaminated air, further studies should be accomplished to determine if ambient air currents are able to adequately dissipate airborne asbestos concentrations emanating from exposed demolition debris.

Until further research is accomplished, OSHA regulations should apply to all manual demolition projects. The manager of a mechanical demolition project (bull dozer) would be well advised to provide personal air monitoring for those workers in the immediate area of potential release.

LEGAL RESPONSIBILITIES /LIABILITIES

Tens of thousands of workers have submitted asbestos-related worker's compensation claims and tort suits resulting in companies and/or their insurers spending hundreds of millions of dollars defending and settling these claims. The science that links asbestos exposure to cancer is quite clear, however, there is little knowledge regarding the affect that differing types of asbestos or differing levels of duration and exposure have on the production of a cancerous event.

OSHA has set the permissible exposure limit at 0.2 f/cc, however, this is much lower than some naturally occurring ambient levels. OSHA has set this limit at a level which conservatively protects abatement workers, but this level may end up being considered overly conservative if and when the overall carcinogenic effects of asbestos are fully understood.

The Air Force must follow the regulatory guidance set forth by agencies such as OSHA and the EPA, however, many regulations require substantial interpretation. In the case of ACJC abatement, the Air Force would limit its potential liability if it would follow the guidance of OSHA for all potentially friable materials which contain any level of asbestos. The following of these guidelines would include those stipulated in Table 5.2, as well as all guidance found in 29 CFR 1926.58. Specifically, the Air Force should provide personal air monitoring whenever an ACM is abated without containment and PPE. These efforts should be terminated when enough data has been collected to indicate that the ACM in question does not present an exposure hazard during removal.

Air Force liability may be substantial, potentially in the tens of millions of dollars, if abatement workers experience asbestos related illnesses sometime in the future. It is not within the scope of this thesis to quantify the potential liability costs, but the current regulatory direction is creating the potential for more stringent legislation, ultimately raising the potential associative costs in the future. EPA asbestos regulations concerning notification, work practices, and disposal requirements are contained in the NESHAPs under the Clean Air Act. The EPA has promulgated changes to the NESHAPs which make both a landfill owner/operator and the generator liable for violations under the NESHAP requirements (Arbuckle, 1993:410). In addition, the EPA has indicated that it will eventually impose more stringent demolition and renovation requirements at some point in the future.

In regards to liability, it is important to note that an employer can be held liable for latent health effects, even when the employer was following acceptable work practices at the time of exposure. Work practices that are acceptable today may not be acceptable at a point in time when the health effects of asbestos are better understood. There is a multitude of litigation cases which indicate that liability be minimized, but total elimination of liability is unlikely if not impossible.

It is beyond the scope of this thesis to summarize the hundreds of past and pending lawsuits. The reader is directed to Asbestos Abatement: Risks and Responsibilities (BNA, 1987) for further information.

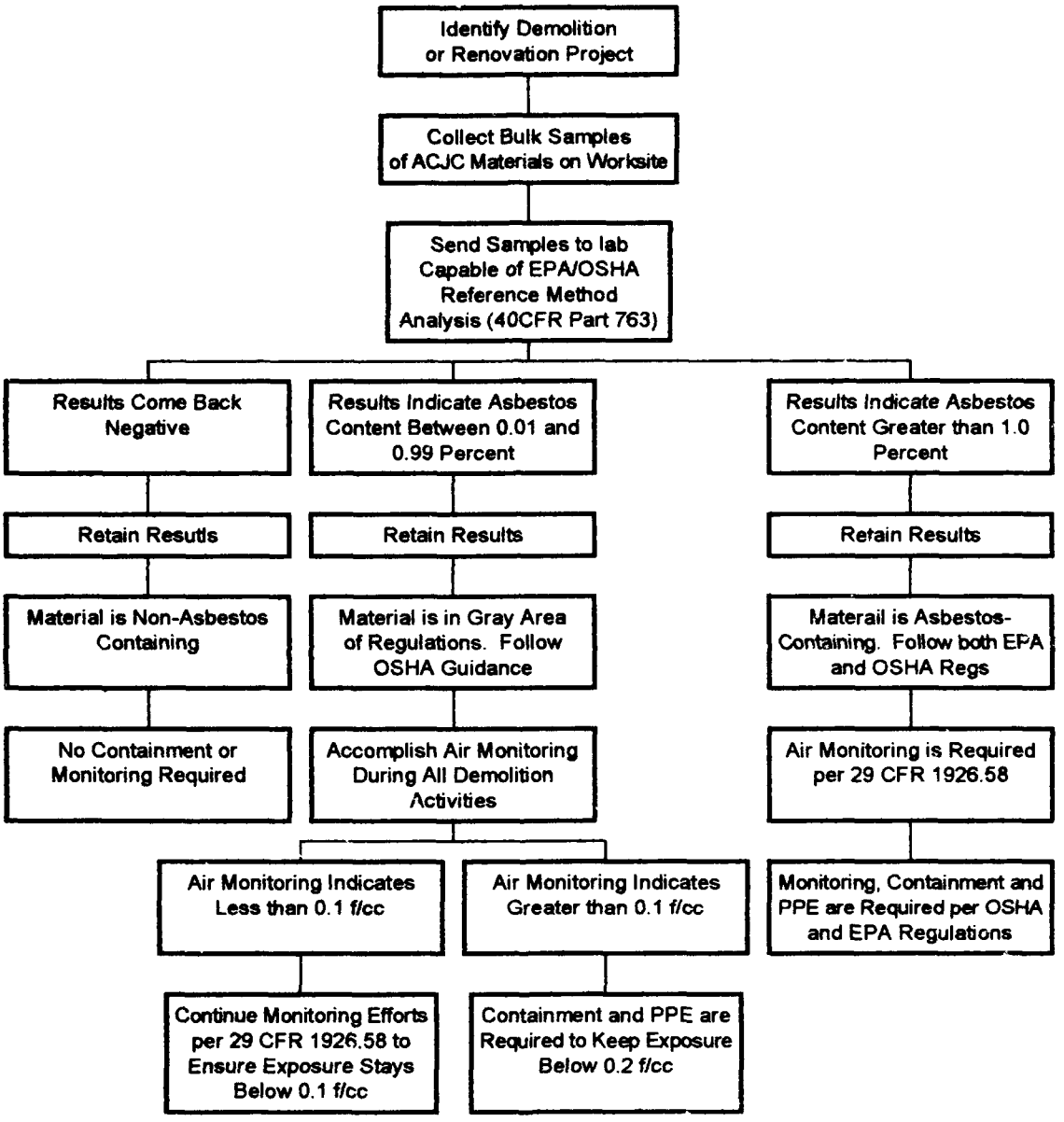
CONCLUSION

Based upon this research, it is recommended that the Air Force continue to actively identify asbestos containing materials in installation facilities. When wall systems are identified as asbestos-containing, demolition of the associated material should be accomplished with a strict air monitoring protocol. If the ACJC has a level less than 1.0 percent asbestos, personal air monitoring should be accomplished to ensure that workers are not exposed to levels which exceed the OSHA PEL. If personal monitoring indicates an asbestos concentration that reaches 0.1 f/cc, OSHA regulations become binding and the ensuing guidance from that point becomes relatively straight forward with little interpretation being required. The following bullets summarize the major steps which the Air Force should follow to minimize the future potential liabilities regarding abatement projects:

- Continue to Identify ACM's in all AF Facilities
- Provide Personal Monitoring for Workers Who Demolish Materials whose Asbestos Content is Greater than 0.1 Percent. Continue until data supports a determination that PEL's are not exceedable
- If Personal Monitoring indicates an Exposure Greater than 0.1 f/cc, Require Containment and use of PPE
- If Exposure Levels Remain Below 0.1 f/cc, Continue Monitoring with no Containment or PPE Required

The Air Force should follow the expanded protocol as described in Table 5-4 below.

FIGURE 5-2: PROPOSED DECISION TREE FOR ACJC ABATEMENT ACTIVITIES



RECOMMENDATIONS FOR FUTURE RESEARCH

This research was conducted with many assumptions which are identified in Chapter 3 of this text. These assumptions produced very conservative estimates of the potential exposure to airborne asbestos fibers during demolition activities. The following is a list of areas which might be improved, thus providing a more precise model of actual exposure episodes.

1. Refine the "Standard Fiber Volume" used in the model: This variable represents the volume of a set of fibers 5, 6, 7, 8, and 9 micrometers in length. Further research might indicate the distribution of these fiber sizes within a given asbestos fiber matrix. If the fiber size distributions were clarified, the resulting change in volume calculation could have a large impact on the overall outcome of exposure level calculations.
2. Actual air monitoring of ACJC demolitions: A controlled experiment during ACJC abatement to measure the actual levels of airborne asbestos during demolition work would be invaluable to the validation of this model. The design and construction of a fixed volume containment chamber might aid in the monitoring of such a project. A fixed volume of ACJC might be pulverized in a fixed volume, thus providing a source for discrete air samples.
3. Refine "Air Exchange Rate": The air exchange rate range used in spreadsheet calculations would change given differing room configurations. If more windows and/or doors were considered in the airflow assumption, asbestos concentration build-up would likely be impacted. The degree to which a change in airflow might impact

actual exposure concentrations is not clear, but this might be clarified with additional research.

APPENDIX A

GLOSSARY OF TERMS AND ACRONYMS

GLOSSARY OF TERMS AND ACRONYMS

ABATEMENT	Lessening the hazard of asbestos. Includes encapsulation, enclosure, repair, and removal of asbestos.
ACTION LEVEL	An OSHA limit of 0.1 asbestos fibers per cubic centimeter of air over and 8 hour period. At the action level, workers must have training and medical exams.
AHERA	The Asbestos Hazard Emergency Response Act. The EPA law which covers asbestos in schools.
AREA AIR SAMPLE	An air sample taken from one spot in a room. It is not good for measuring how much asbestos is in a room during work performance.
ASBESTOS	A natural mineral used for insulation in many buildings. Asbestos breaks into fibers, causing lung cancer when inhaled as well as other diseases.
ASBESTOS CONTAINING MATERIAL (ACM)	Any material which contains asbestos fibers in a concentration higher than one percent.
ASBESTOSIS	A disease caused by asbestos. It is the scarring of the lungs, also known as white-lung.
BULK SAMPLE	A piece of material which is sent to a lab for analysis for asbestos content.
CANCER	A large group of diseases where cells grow abnormally, rapidly and out of control.
CLEAN ROOM	The last room in a decontamination structure used for abatement activities. Clean suits, respirators and street cloths are stored here.
CLEARANCE AIR SAMPLE	An area air sample taken at the end of the abatement project. It is used to determine that the room is clean enough to occupy without a respirator.

CONTAINMENT	Isolating a work area from the rest of a building or structure. Usually accomplished by putting polyethylene sheets of plastic on the walls and floors of a room which has a negative air machine attached. The negative air machine filters asbestos fibers, thus keeping fibers from migrating outside work area.
ENCAPSULATE	To cover asbestos with a sticky paint-like substance, thus controlling the release of asbestos fibers from the asbestos containing material.
ENERGY DISPERSIVE X-RAY ANALYSIS (EDXA)	A technique where X-rays are emitted from interactions between an electron beam and asbestos fibers. This interaction is analyzed to determine asbestos content.
ENVIRONMENTAL PROTECTION AGENCY (EPA)	An agency of the United States Government having the task of protecting the environment.
EXPOSURE	The result of a person being exposed to air which contains airborne asbestos fibers.
FIBER PER CC (f/cc)	Fibers per cubic centimeter of air. The standard way that asbestos airborne concentrations are measured.
FIBER	A single strand or particle of asbestos.
FIBROSIS	A disease where scar tissue is formed in the connective tissue of the lungs.
FRIABLE	A substance is friable if: when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.
INDUSTRIAL HYGIENIST	A scientist who studies the control of workplace health and safety hazards.
MESOTHELIOMA	A disease caused by asbestos. A cancer of the lining of the lungs, stomach, or digestive system.
MSHA	Mine Safety and Health Administration. An agency of the United States Government which approves respirators for use.

NESHAP	National Emission Standards for Hazardous Air Pollutants. The EPA regulation that contains asbestos regulations.
NIOSH	National Institute for Occupational Health and Safety. A United States agency that researches worker health and safety and recommends regulation changes to OSHA.
OSHA	Occupational Health and Safety Administration. An agency of the United States Government which develops and enforces worker health and safety regulations on the jobsite.
PHASE CONTRAST MICROSCOPY (PCM)	The analysis method used to count asbestos fibers submitted to a lab from personal air samples. PCM is sometimes also used for the analysis of area samples.
PERMISSIBLE EXPOSURE LIMIT (PEL)	The OSHA standard of 0.2 f/cc of air averaged over an 8 hour time period.
PERSONAL AIR SAMPLE	A sample taken in a worker's breathing area. This is an accurate measure of exposure to an individual.
PLEURA	A double layer of lining in the human chest which covers the lungs and inside of the rib cage.
RESPIRATOR	A face mask used to protect a worker from exposure to airborne asbestos fibers by way of filtration of inhaled air.
SELECTIVE AREA ELECTRON DIFFRACTION (SAED)	A technique for the analysis of electron diffraction patterns created by interactions between an electron beam and asbestos fibers. This analysis method is used to quantify asbestos within a test material.
SURFACTANT	A chemical added to water to lower the surface tension. This allows the solution soak into asbestos material faster.
TRANSMISSION ELECTRON MICROSCOPY (TEM)	The analysis method of choice, having better specificity for asbestos fibers than other analysis methods.

APPENDIX B

SPREADSHEET CALCULATIONS

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 15' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
15*25*8	Dimensions of Room (Ft)	84960000	Room Volume in Cubic Centimeters
3000	Cubic Footage of Room	579231.5	Wall Area in Room in Square Centimeters
623.5	Wall Area of Room (Sq FT)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	6.235	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft of wall)	3.741	Gallons of ACJC Applied to Walls
		14159.685	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume within ACJC. Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10%. Number of Fibers per cc	For Asb Content of 0.20%. Number of Fibers per cc	For Asb Content of 0.30%. Number of Fibers per cc	For Asb Content of 0.40%. Number of Fibers per cc	For Asb Content of .50%. Number of Fibers per cc	For Asb Content of 0.60%. Number of Fibers per cc	For Asb Content of 0.70%. Number of Fibers per cc	For Asb Content of 0.80%. Number of Fibers per cc	For Asb Content of 90%. Number of Fibers per cc
0.40	0.79	404.0	808.0	1212.1	1616.1	2020.1	2424.1	2828.2	3232.2	3636.2
0.58	1.23	374.4	748.8	1123.2	1497.6	1871.9	2246.3	2620.7	2995.1	3369.5
0.63	0.88	567.9	1135.9	1703.8	2271.8	2839.7	3407.6	3975.6	4543.5	5111.5
0.62	1.36	366.5	733.0	1099.4	1465.9	1832.4	2198.9	2565.4	2931.9	3298.3
0.83	0.74	893.5	1787.1	2680.6	3574.2	4467.7	5361.2	6254.8	7148.3	8041.9
0.48	0.86	441.9	883.8	1326.6	1767.5	2209.4	2651.3	3093.2	3535.0	3976.9
0.43	0.76	450.2	900.4	1350.7	1800.9	2251.1	2701.3	3151.5	3601.7	4052.0
0.61	1.10	438.0	875.9	1313.9	1751.9	2189.8	2627.8	3065.8	3503.7	3941.7
0.64	1.17	433.3	866.6	1299.9	1733.2	2166.5	2599.8	3033.1	3466.4	3899.7
0.61	0.80	613.6	1227.2	1840.7	2454.3	3067.9	3681.5	4295.1	4908.6	5522.2
0.90	1.35	530.3	1060.7	1591.0	2121.4	2651.7	3182.1	3712.4	4242.7	4773.1
0.86	0.99	690.1	1380.2	2070.3	2760.4	3450.5	4140.6	4830.7	5520.8	6210.9
0.43	1.43	239.5	479.0	718.5	958.1	1197.6	1437.1	1676.6	1916.1	2155.6
0.50	0.74	543.6	1087.1	1630.7	2174.2	2717.8	3261.4	3804.9	4348.5	4892.0
0.76	1.22	496.1	992.2	1488.2	1984.3	2480.4	2976.5	3472.5	3968.6	4464.7
0.73	0.84	684.5	1369.0	2053.5	2738.0	3422.4	4106.9	4791.4	5475.9	6160.4
0.40	0.72	447.6	895.2	1342.8	1790.4	2238.0	2685.6	3133.2	3580.8	4028.4
0.55	0.96	452.8	905.6	1358.3	1811.1	2263.9	2716.7	3169.4	3622.2	4075.0
0.56	1.40	320.6	641.3	961.9	1282.6	1603.2	1923.8	2244.5	2565.1	2885.7
0.48	1.08	354.0	707.9	1061.9	1415.9	1769.8	2123.8	2477.8	2831.7	3185.7
0.69	1.21	452.4	904.8	1357.2	1809.6	2262.0	2714.4	3166.8	3619.2	4071.6
0.84	1.16	571.6	1143.2	1714.7	2286.3	2857.9	3429.5	4001.0	4572.6	5144.2
0.89	1.46	488.2	976.4	1464.6	1952.8	2441.0	2929.2	3417.4	3905.6	4393.8
0.58	1.07	427.8	855.6	1283.4	1711.1	2138.9	2566.7	2994.5	3422.3	3850.1
0.59	1.42	333.3	666.7	1000.0	1333.4	1666.7	2000.1	2333.4	2666.7	3000.1
0.67	1.14	467.6	935.2	1402.8	1870.5	2338.1	2805.7	3273.3	3740.9	4208.5
0.86	1.11	607.7	1215.4	1823.1	2430.8	3038.5	3646.2	4253.9	4861.6	5469.3
0.49	0.78	502.9	1005.8	1508.6	2011.5	2514.4	3017.3	3520.1	4023.0	4525.9
0.65	1.37	377.3	754.5	1131.8	1509.0	1886.3	2263.5	2640.8	3018.0	3395.3
0.83	1.49	445.4	890.8	1336.2	1781.6	2226.9	2672.3	3117.7	3563.1	4008.5
0.77	1.01	606.5	1213.1	1819.6	2426.2	3032.7	3639.3	4245.8	4852.3	5458.9
0.81	0.83	772.9	1545.7	2318.6	3091.5	3864.3	4637.2	5410.1	6182.9	6955.8
0.42	1.25	264.4	528.7	793.1	1057.5	1321.8	1586.2	1850.6	2114.9	2379.3
0.88	1.24	565.9	1131.7	1697.6	2263.5	2829.3	3395.2	3961.1	4526.9	5092.8
0.48	0.80	474.3	948.6	1422.9	1897.2	2371.4	2845.7	3320.0	3794.3	4268.6
0.42	1.37	241.5	482.9	724.4	965.9	1207.3	1448.8	1690.2	1931.7	2173.2
0.52	0.74	556.0	1112.0	1668.0	2224.0	2780.0	3336.0	3892.0	4448.0	5004.0
0.44	0.91	388.5	777.0	1165.4	1553.9	1942.4	2330.9	2719.3	3107.8	3496.3
0.88	0.80	880.9	1761.7	2642.6	3523.4	4404.3	5285.1	6166.0	7046.8	7927.7
0.42	1.06	317.4	634.8	952.1	1269.5	1586.9	1904.3	2221.6	2539.0	2856.4
0.84	1.43	469.8	939.6	1409.5	1879.3	2349.1	2818.9	3288.8	3758.6	4228.4
0.84	0.77	871.0	1741.9	2612.9	3483.9	4354.8	5225.8	6096.8	6967.7	7838.7
0.72	1.30	441.6	883.1	1324.7	1766.3	2207.8	2649.4	3091.0	3532.6	3974.1
0.77	0.80	768.2	1536.3	2304.5	3072.6	3840.8	4609.0	5377.1	6145.3	6913.5
0.88	1.20	588.1	1176.2	1764.4	2352.5	2940.6	3528.7	4116.9	4705.0	5293.1
0.50	1.20	330.9	661.8	992.7	1323.6	1654.4	1986.3	2316.2	2647.1	2978.0
0.87	1.27	548.5	1097.0	1645.6	2194.1	2742.6	3291.1	3839.7	4388.2	4936.7
0.59	1.47	321.7	643.5	965.2	1286.9	1608.6	1930.4	2252.1	2573.8	2895.5
0.63	1.33	378.8	757.7	1136.5	1515.4	1894.2	2273.0	2651.9	3030.7	3409.5
0.44	1.25	277.5	554.9	832.4	1109.8	1387.3	1664.7	1942.2	2219.6	2497.1
0.45	1.46	246.4	492.8	739.2	985.6	1231.9	1478.3	1724.7	1971.1	2217.5
0.77	0.95	647.1	1294.1	1941.2	2588.2	3235.3	3882.4	4529.4	5176.5	5823.6
0.53	0.83	508.3	1016.6	1524.8	2033.1	2541.4	3049.7	3558.0	4066.2	4574.5
0.86	0.80	847.5	1695.0	2542.5	3390.0	4237.5	5085.0	5932.5	6780.0	7627.5
0.62	0.96	508.9	1017.9	1526.8	2035.7	2544.7	3053.6	3562.5	4071.5	4580.4
0.82	0.73	886.7	1773.4	2660.1	3546.7	4433.4	5320.1	6206.8	7093.5	7980.2
0.89	1.12	629.7	1259.5	1889.2	2519.0	3148.7	3778.5	4408.2	5037.9	5667.7
0.58	0.75	611.4	1222.7	1834.1	2445.5	3056.9	3668.2	4279.6	4891.0	5502.3
0.82	1.05	620.2	1240.3	1860.5	2480.7	3100.9	3721.0	4341.2	4961.4	5581.6
0.41	0.73	447.1	894.2	1341.3	1788.3	2235.4	2682.5	3129.6	3576.7	4023.8
0.76	1.21	498.9	997.8	1496.7	1995.6	2494.5	2993.4	3492.3	3991.2	4490.1
0.84	1.01	662.7	1325.3	1988.0	2650.6	3313.3	3976.0	4638.6	5301.3	5963.9
0.42	1.25	267.3	534.7	802.0	1069.4	1336.7	1604.1	1871.4	2138.8	2406.1
0.87	0.81	856.1	1712.2	2568.3	3424.4	4280.6	5136.7	5992.8	6848.9	7705.0
0.69	0.88	625.1	1250.3	1875.4	2500.6	3125.7	3750.8	4376.0	5001.1	5626.3
0.77	1.27	484.2	968.5	1452.7	1936.9	2421.2	2905.4	3389.6	3873.9	4358.1
0.43	0.86	400.1	800.1	1200.2	1600.3	2000.3	2400.4	2800.4	3200.5	3600.6
0.78	1.17	529.2	1058.5	1587.7	2116.9	2646.1	3175.4	3704.6	4233.8	4763.1
0.83	0.78	844.7	1689.4	2534.1	3378.9	4223.6	5068.3	5913.0	6757.7	7602.4
0.48	0.98	390.7	781.3	1172.0	1562.6	1953.3	2343.9	2734.6	3125.2	3515.9
0.76	1.09	564.1	1108.2	1662.4	2216.5	2770.6	3324.7	3878.9	4433.0	4987.1
0.57	0.89	509.0	1018.0	1527.0	2036.0	2545.0	3054.0	3563.0	4072.0	4581.0
0.81	1.03	625.8	1251.6	1877.3	2503.1	3128.9	3754.7	4380.5	5006.3	5632.0

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.57	1.09	412.5	824.9	1237.4	1649.9	2062.3	2474.8	2887.3	3299.7	3712.2
0.69	1.04	531.8	1063.6	1595.4	2127.3	2659.1	3190.9	3722.7	4254.5	4786.3
0.78	1.11	562.3	1124.6	1686.9	2249.2	2811.5	3373.8	3936.1	4498.4	5060.7
0.42	0.73	460.3	920.7	1381.0	1841.3	2301.7	2762.0	3222.4	3682.7	4143.0
0.59	0.95	494.6	989.2	1483.8	1978.4	2473.0	2967.6	3462.2	3956.8	4451.4
0.61	1.20	401.4	802.7	1204.1	1605.4	2006.8	2408.1	2809.5	3210.8	3612.2
0.85	1.11	612.9	1225.7	1838.6	2451.5	3064.3	3677.2	4290.1	4902.9	5515.8
0.46	0.88	415.2	830.4	1245.6	1660.7	2075.9	2491.1	2906.3	3321.5	3736.7
0.73	0.77	753.6	1507.2	2260.8	3014.4	3768.0	4521.6	5275.2	6028.8	6782.4
0.57	1.34	336.3	672.6	1008.9	1345.2	1681.5	2017.8	2354.1	2690.4	3026.7
0.59	0.88	536.1	1072.2	1608.3	2144.4	2680.5	3216.6	3752.7	4288.8	4824.9
0.71	0.99	568.9	1137.8	1706.7	2275.6	2744.5	3413.4	3982.3	4551.3	5120.2
0.64	1.48	342.0	684.0	1026.0	1368.0	1710.0	2052.0	2394.0	2736.0	3078.0
0.76	1.39	435.4	870.7	1306.1	1741.5	2176.8	2612.2	3047.5	3482.9	3918.3
0.68	0.74	733.6	1467.3	2200.9	2934.6	3668.2	4401.9	5135.5	5869.2	6602.8
0.60	0.82	585.2	1170.4	1755.6	2340.8	2926.0	3511.2	4096.4	4681.6	5266.9
0.81	1.25	513.5	1027.0	1540.5	2054.0	2567.5	3081.0	3594.5	4108.0	4621.5
0.52	1.26	330.2	660.4	990.6	1320.7	1660.9	1981.1	2311.3	2641.5	2971.7
0.47	1.41	265.1	530.2	795.4	1060.5	1325.6	1590.7	1855.8	2120.9	2386.1
0.90	1.46	490.6	981.3	1471.9	1962.5	2453.1	2943.8	3434.4	3925.0	4415.7
0.42	1.21	278.0	556.0	834.1	1112.1	1390.1	1668.1	1946.2	2224.2	2502.2
0.82	0.91	716.5	1433.0	2149.4	2865.9	3582.4	4298.9	5015.4	5731.8	6448.3
0.74	1.28	457.3	914.6	1371.9	1829.2	2286.5	2743.8	3201.1	3658.4	4115.7
0.87	1.09	634.0	1267.9	1901.9	2535.9	3169.9	3803.8	4437.8	5071.8	5705.7
0.47	1.30	286.0	571.9	857.9	1143.9	1429.8	1715.8	2001.8	2287.7	2573.7
0.49	1.35	288.5	577.1	865.6	1154.1	1442.7	1731.2	2019.7	2308.2	2596.8
0.86	0.91	752.6	1505.3	2257.9	3010.6	3763.2	4515.8	5268.5	6021.1	6773.7
0.47	1.44	258.7	517.4	776.1	1034.8	1293.6	1552.3	1811.0	2069.7	2328.4
0.61	1.15	420.2	840.5	1260.7	1681.0	2101.2	2521.4	2941.7	3361.9	3782.2
0.64	0.82	617.2	1234.5	1851.7	2468.9	3086.2	3703.4	4320.7	4937.9	5555.1
0.44	0.85	410.8	821.5	1232.3	1643.0	2053.8	2464.5	2875.3	3286.1	3696.8
0.46	0.97	380.5	761.1	1141.6	1522.2	1902.7	2283.2	2663.8	3044.3	3424.8
0.65	1.40	368.7	737.5	1106.2	1474.9	1843.6	2212.4	2581.1	2949.8	3318.5
0.87	1.07	647.4	1294.7	1942.1	2589.4	3236.8	3884.1	4531.5	5178.8	5826.2
0.83	1.36	487.0	974.1	1461.1	1948.2	2435.2	2922.2	3409.3	3896.3	4383.4
0.85	1.10	617.5	1234.9	1852.4	2469.8	3087.3	3704.7	4322.2	4939.6	5557.1
0.51	1.04	392.0	783.9	1175.9	1567.9	1959.8	2351.8	2743.7	3135.7	3527.7
0.41	1.33	245.7	491.4	737.1	982.8	1228.5	1474.2	1719.9	1965.6	2211.3
0.77	1.44	423.3	846.7	1270.0	1693.4	2116.7	2540.0	2963.4	3386.7	3810.1
0.71	0.93	607.4	1214.8	1822.2	2429.6	3037.0	3644.4	4251.8	4859.2	5466.6
0.55	1.40	311.7	623.5	935.2	1246.9	1558.7	1870.4	2182.2	2493.9	2805.6
0.66	1.18	442.9	885.8	1328.7	1771.6	2214.6	2657.5	3100.4	3543.3	3986.2
0.80	1.42	450.3	900.6	1351.0	1801.3	2251.6	2701.9	3152.2	3602.6	4052.9
0.74	1.02	575.6	1151.2	1726.9	2302.5	2878.1	3453.7	4029.3	4604.9	5180.6
0.73	1.38	422.2	844.3	1266.5	1688.6	2110.8	2532.9	2955.1	3377.2	3799.4
0.79	1.19	530.0	1060.0	1589.9	2119.9	2649.9	3179.9	3709.8	4239.8	4769.8
0.43	1.18	288.3	576.6	864.9	1153.2	1441.4	1729.7	2018.0	2306.3	2594.6
0.61	1.27	383.0	766.0	1148.9	1531.9	1914.9	2297.9	2680.8	3063.8	3446.8
0.88	1.38	507.6	1015.3	1522.9	2030.6	2538.2	3045.8	3553.5	4061.1	4568.7
0.54	0.93	460.9	921.8	1382.7	1843.7	2304.6	2765.5	3226.4	3687.3	4148.2
0.58	1.46	316.8	633.5	950.3	1267.1	1583.9	1900.6	2217.4	2534.2	2850.9
0.44	0.73	479.9	959.8	1439.7	1919.6	2399.4	2879.3	3359.2	3839.1	4319.0
0.60	0.84	564.5	1128.9	1693.4	2257.8	2822.3	3386.7	3951.2	4515.6	5080.1
0.55	0.76	575.4	1150.8	1726.1	2301.5	2876.9	3452.3	4027.6	4603.0	5178.4
0.78	0.95	655.0	1310.1	1965.1	2620.2	3275.2	3930.3	4585.3	5240.4	5895.4
0.47	1.21	310.0	620.1	930.1	1240.2	1550.2	1860.3	2170.3	2480.4	2790.4
0.50	1.11	354.9	709.8	1064.6	1419.5	1774.4	2129.3	2484.1	2839.0	3193.9
0.65	1.46	354.2	708.3	1062.5	1416.6	1770.8	2125.0	2479.1	2833.3	3187.5
0.75	0.74	801.0	1602.1	2403.1	3204.2	4005.2	4806.3	5607.3	6408.4	7209.4
0.78	0.82	759.4	1518.8	2278.2	3037.6	3797.0	4556.4	5315.8	6075.3	6834.7
0.42	0.93	362.2	724.4	1086.6	1448.7	1810.9	2173.1	2535.3	2897.5	3259.7
0.84	0.87	768.8	1537.5	2306.3	3075.0	3843.8	4612.5	5381.3	6150.0	6918.8
0.64	0.84	606.6	1213.2	1819.8	2426.5	3033.1	3639.7	4246.3	4852.9	5459.5
0.61	0.95	511.3	1022.6	1533.9	2045.2	2556.5	3067.8	3579.1	4090.3	4601.6
0.77	1.15	534.8	1069.7	1604.5	2139.4	2674.2	3209.0	3743.9	4278.7	4813.5
0.84	0.85	783.7	1567.4	2351.0	3134.7	3918.4	4702.1	5485.8	6269.4	7053.1
0.82	1.03	629.4	1258.8	1888.3	2517.7	3147.1	3776.5	4406.0	5035.4	5664.8
0.61	0.87	555.5	1111.0	1666.5	2222.0	2777.5	3333.1	3888.6	4444.1	4999.6
0.56	1.10	400.2	800.4	1200.6	1600.8	2001.0	2401.2	2801.5	3201.7	3601.9
0.51	1.29	312.9	625.9	938.8	1251.8	1564.7	1877.6	2190.6	2503.5	2816.4
0.80	1.37	466.7	933.4	1400.2	1866.9	2333.6	2800.3	3267.0	3733.8	4200.5
0.62	0.99	496.7	993.4	1490.1	1986.8	2483.5	2980.1	3476.8	3973.5	4470.2
0.85	0.86	789.3	1578.6	2367.9	3157.2	3946.5	4735.7	5525.0	6314.3	7103.6
0.49	0.85	457.9	915.7	1373.6	1831.4	2289.3	2747.1	3205.0	3662.8	4120.7
0.72	0.74	773.8	1547.6	2321.4	3095.2	3868.9	4642.7	5416.5	6190.3	6964.1
0.80	1.00	633.7	1267.5	1901.2	2535.0	3168.7	3802.4	4436.2	5069.9	5703.7
0.77	1.30	470.9	941.7	1412.6	1883.4	2354.3	2825.2	3296.0	3766.9	4237.7
0.42	1.31	258.0	515.9	773.9	1031.9	1289.9	1547.8	1805.8	2063.8	2321.8
0.50	0.95	422.0	844.0	1266.9	1687.9	2109.9	2531.9	2953.8	3375.8	3797.8
0.67	1.15	464.5	929.0	1393.5	1858.0	2322.5	2787.0	3251.5	3716.0	4180.5
0.65	1.31	393.4	786.8	1180.3	1573.7	1967.1	2360.5	2753.9	3147.4	3540.8
0.44	1.36	260.6	521.2	781.8	1042.4	1302.9	1563.5	1824.1	2084.7	2345.3
0.62	1.18	418.9	837.8	1256.6	1675.5	2094.4	2513.3	2932.2	3351.0	3769.9
0.90	0.78	920.0	1840.0	2759.9	3679.9	4599.9	5519.9	6439.9	7359.8	8279.8
0.45	1.27	283.7	567.5	851.2	1134.9	1418.7	1702.4	1986.1	2269.9	2553.6
0.47	0.90	414.6	829.1	1243.7	1658.2	2072.8	2487.3	2901.9	3316.4	3731.0
0.57	1.32	344.5	689.0	1033.6	1378.1	1722.6	2067.1	2411.6	2756.2	3100.7
0.43	0.91	373.4	746.9	1120.3	1493.8	1867.2	2240.7	2614.1	2987.5	3361.0
0.73	1.14	510.1	1020.1	1530.2	2040.2	2550.3	3060.3	3570.4	4080.4	4590.5

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of .90% Number of Fibers per cc
0.46	0.94	376.6	753.2	1129.9	1506.5	1883.1	2259.7	2636.4	3013.0	3389.6
0.49	0.87	451.7	903.4	1355.1	1806.8	2258.6	2710.3	3162.0	3613.7	4066.4
0.76	0.95	635.2	1270.4	1905.6	2540.8	3176.1	3811.3	4446.5	5081.7	5716.9
0.59	0.82	572.2	1144.4	1716.7	2288.9	2861.1	3433.3	4005.5	4577.8	5150.0
0.49	1.48	264.4	528.9	793.3	1057.8	1322.2	1586.6	1851.1	2115.5	2380.0
0.48	1.18	321.5	643.1	964.6	1286.2	1607.7	1929.3	2250.8	2572.3	2893.9
0.46	1.02	358.7	717.4	1076.1	1434.8	1793.4	2152.1	2510.8	2869.5	3228.2
0.45	1.21	293.5	587.0	880.5	1174.0	1467.5	1761.0	2054.6	2348.1	2641.6
0.68	1.14	475.9	951.8	1427.7	1903.7	2379.6	2855.5	3331.4	3807.3	4283.2
0.59	1.22	380.4	760.7	1141.1	1521.5	1901.8	2282.2	2662.6	3042.9	3423.3
0.77	0.96	642.6	1285.2	1927.8	2570.4	3213.0	3855.7	4498.3	5140.9	5783.5
0.61	1.04	465.5	931.0	1396.5	1862.1	2327.6	2793.1	3258.6	3724.1	4189.6
0.87	0.82	847.4	1694.8	2542.2	3389.6	4237.0	5084.4	5931.8	6779.2	7626.6
0.63	1.02	493.8	987.5	1481.3	1975.0	2468.8	2962.5	3456.3	3950.1	4443.8
0.79	0.87	722.2	1444.4	2166.6	2888.8	3611.0	4333.2	5056.4	5777.6	6499.8
0.41	1.47	222.7	445.4	668.1	890.8	1113.5	1336.3	1559.0	1781.7	2004.4
0.85	0.76	893.8	1787.6	2681.4	3575.2	4469.1	5362.9	6256.7	7150.5	8044.3
0.63	1.07	471.4	942.8	1414.2	1885.6	2357.0	2828.3	3299.7	3771.1	4242.5
0.69	0.91	597.3	1194.6	1791.9	2389.2	2986.5	3583.8	4181.1	4778.4	5375.7
0.47	0.70	536.8	1073.6	1610.4	2147.3	2684.1	3220.9	3757.7	4294.5	4831.3
0.66	1.25	416.0	831.9	1247.9	1663.9	2079.8	2495.8	2911.8	3327.7	3743.7
0.57	0.99	459.5	919.1	1378.6	1838.2	2297.7	2757.2	3216.8	3676.3	4135.9
0.43	1.06	323.7	647.3	971.0	1294.6	1618.3	1942.0	2265.6	2589.3	2913.0
0.78	1.03	604.1	1208.2	1812.3	2416.4	3020.5	3624.6	4228.7	4832.8	5436.9
0.84	1.18	571.1	1142.1	1713.2	2284.2	2855.3	3426.4	3997.4	4568.5	5139.5
0.41	0.87	374.0	748.1	1122.1	1496.1	1870.2	2244.2	2618.3	2992.3	3366.3
0.42	0.86	388.1	776.2	1164.4	1552.5	1940.6	2328.7	2716.8	3105.0	3493.1
0.66	0.88	592.5	1185.1	1777.6	2370.2	2962.7	3555.3	4147.8	4740.4	5332.9
0.70	0.75	733.8	1467.5	2201.3	2935.1	3668.8	4402.6	5136.4	5870.1	6603.9
0.88	1.14	613.7	1227.5	1841.2	2454.9	3068.7	3682.4	4296.2	4909.9	5523.6
0.54	0.96	445.6	891.3	1336.9	1782.5	2228.2	2673.8	3119.4	3566.1	4010.7
0.86	0.83	833.7	1667.3	2501.0	3334.6	4168.3	5002.0	5835.6	6669.3	7502.9
0.42	0.86	389.6	779.2	1168.8	1558.3	1947.9	2337.5	2727.1	3116.7	3506.3
0.59	1.50	314.4	628.8	943.1	1257.5	1571.9	1886.3	2200.7	2515.0	2829.4
0.51	1.37	296.6	593.2	889.7	1186.3	1482.9	1779.5	2076.1	2372.7	2669.2
0.87	0.79	875.1	1750.1	2625.2	3500.3	4375.3	5250.4	6125.4	7000.5	7875.6
0.46	1.40	258.6	517.2	775.8	1034.5	1293.1	1551.7	1810.3	2068.9	2327.5
0.46	1.01	362.5	725.0	1087.5	1450.0	1812.5	2175.0	2537.6	2900.1	3262.6
	Averages:	499	998	1497	1996	2495	2994	3493	3992	4491

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 20' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
20*25*8	Dimensions of Room (Ft)	113280000	Room Volume in Cubic Centimeters
4000	Cubic Footage of Room	668880	Wall Area in Room in Square Centimeters
720	Wall Area of Room (Sq Ft)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	7.2	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft of wall)	4.32	Gallons of ACJC Applied to Walls
		16361.2	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume within ACJC. Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.40	0.79	303.0	606.0	909.1	1212.1	1515.1	1818.1	2121.1	2424.1	2727.2
0.58	1.23	280.8	561.6	842.4	1123.2	1404.0	1684.7	1965.5	2246.3	2527.1
0.63	0.88	426.0	851.9	1277.9	1703.8	2129.8	2555.7	2981.7	3407.6	3833.6
0.62	1.36	274.9	549.7	824.6	1099.4	1374.3	1649.2	1924.0	2198.9	2473.8
0.83	0.74	670.2	1340.3	2010.5	2680.6	3350.8	4020.9	4691.1	5361.2	6031.4
0.48	0.86	331.4	662.8	994.2	1325.6	1657.0	1988.5	2319.9	2651.3	2982.7
0.43	0.76	337.7	675.3	1013.0	1350.7	1688.3	2026.0	2363.6	2701.3	3039.0
0.61	1.10	328.5	656.9	985.4	1313.9	1642.4	1970.8	2299.3	2627.8	2956.3
0.64	1.17	325.0	649.9	974.9	1299.9	1624.9	1949.8	2274.8	2599.8	2924.8
0.61	0.80	460.2	920.4	1380.6	1840.7	2300.9	2761.1	3221.3	3681.5	4141.7
0.90	1.35	397.8	795.5	1193.3	1591.0	1988.8	2386.5	2784.3	3182.1	3579.8
0.86	0.99	517.6	1035.1	1552.7	2070.3	2587.9	3105.4	3623.0	4140.6	4658.2
0.43	1.43	179.6	359.3	538.9	718.5	898.2	1077.8	1257.5	1437.1	1616.7
0.50	0.74	407.7	815.3	1223.0	1630.7	2038.3	2446.0	2853.7	3261.4	3669.0
0.76	1.22	372.1	744.1	1116.2	1488.2	1860.3	2232.3	2604.4	2976.5	3348.5
0.73	0.84	513.4	1026.7	1540.1	2053.5	2566.8	3080.2	3593.6	4106.9	4620.3
0.40	0.72	335.7	671.4	1007.1	1342.8	1678.5	2014.2	2349.9	2685.6	3021.3
0.56	0.96	339.6	679.2	1018.8	1358.3	1697.9	2037.5	2377.1	2716.7	3056.3
0.56	1.40	240.5	481.0	721.4	961.9	1202.4	1442.9	1683.3	1923.8	2164.3
0.48	1.08	265.5	530.9	796.4	1061.9	1327.4	1592.8	1858.3	2123.8	2389.3
0.69	1.21	339.3	678.6	1017.9	1357.2	1696.5	2035.8	2375.1	2714.4	3053.7
0.84	1.16	428.7	857.4	1286.0	1714.7	2143.4	2572.1	3000.8	3429.5	3858.1
0.89	1.46	366.1	732.3	1098.4	1464.6	1830.7	2196.9	2563.0	2929.2	3295.3
0.58	1.07	320.8	641.7	962.5	1283.4	1604.2	1925.0	2245.9	2566.7	2887.6
0.59	1.42	250.0	500.0	750.0	1000.0	1250.0	1500.0	1750.1	2000.1	2250.1
0.67	1.14	350.7	701.4	1052.1	1402.8	1753.5	2104.3	2455.0	2805.7	3156.4
0.85	1.11	456.8	913.5	1367.3	1823.1	2278.9	2734.6	3190.4	3646.2	4102.0
0.49	0.78	377.2	754.3	1131.5	1508.6	1885.8	2262.9	2640.1	3017.3	3394.4
0.65	1.37	282.9	565.9	848.8	1131.8	1414.7	1697.6	1980.6	2263.5	2546.5
0.83	1.49	334.0	668.1	1002.1	1336.2	1670.2	2004.3	2338.3	2672.3	3006.4
0.77	1.01	454.9	909.8	1364.7	1819.6	2274.5	2729.4	3184.4	3639.3	4094.2
0.81	0.83	579.6	1159.3	1738.9	2318.6	2898.2	3477.9	4057.5	4637.2	5216.8
0.42	1.25	198.3	396.6	594.8	793.1	991.4	1189.7	1387.9	1586.2	1784.5
0.88	1.24	424.4	848.8	1273.2	1697.6	2122.0	2546.4	2970.8	3395.2	3819.6
0.48	0.80	355.7	711.4	1067.1	1422.9	1778.6	2134.3	2490.0	2845.7	3201.4
0.42	1.37	181.1	362.2	543.3	724.4	905.5	1086.6	1267.7	1448.8	1629.9
0.52	0.74	417.0	834.0	1251.0	1668.0	2085.0	2502.0	2919.0	3336.0	3753.0
0.44	0.91	291.4	582.7	874.1	1165.4	1456.8	1748.1	2039.5	2330.9	2622.2
0.88	0.80	660.6	1321.3	1981.9	2642.6	3303.2	3963.9	4624.5	5285.1	5945.8
0.42	1.06	238.0	476.1	714.1	952.1	1190.2	1428.2	1666.2	1904.3	2142.3
0.84	1.43	352.4	704.7	1057.1	1409.5	1761.8	2114.2	2466.6	2818.9	3171.3
0.84	0.77	653.2	1306.4	1959.7	2612.9	3266.1	3919.3	4572.6	5225.8	5879.0
0.72	1.30	331.2	662.4	993.5	1324.7	1655.9	1987.1	2318.2	2649.4	2980.6
0.77	0.80	576.1	1152.2	1728.4	2304.5	2880.6	3456.7	4032.9	4609.0	5185.1
0.88	1.20	441.1	882.2	1323.3	1764.4	2205.5	2646.5	3087.6	3528.7	3969.8
0.50	1.20	248.2	496.3	744.5	992.7	1240.8	1489.0	1737.2	1985.3	2233.5
0.87	1.27	411.4	822.8	1234.2	1645.6	2057.0	2468.4	2879.8	3291.1	3702.5
0.59	1.47	241.3	482.6	723.9	965.2	1206.5	1447.8	1689.1	1930.4	2171.7
0.63	1.33	284.1	568.3	852.4	1136.5	1420.6	1704.8	1988.9	2273.0	2557.2
0.44	1.25	208.1	416.2	624.3	832.4	1040.5	1248.6	1456.6	1664.7	1872.8
0.45	1.46	184.8	369.6	554.4	739.2	924.0	1108.7	1293.5	1478.3	1663.1
0.77	0.95	485.3	970.6	1455.9	1941.2	2426.5	2911.8	3397.1	3882.4	4367.7
0.53	0.83	381.2	762.4	1143.6	1524.8	1906.1	2287.3	2668.5	3049.7	3430.9
0.86	0.80	635.6	1271.2	1906.9	2542.5	3178.1	3813.7	4449.4	5085.0	5720.6
0.62	0.96	381.7	763.4	1145.1	1526.8	1908.5	2290.2	2671.9	3053.6	3435.3
0.82	0.73	665.0	1330.0	1995.0	2660.1	3325.1	3990.1	4655.1	5320.1	5985.1
0.89	1.12	472.3	944.6	1416.9	1889.2	2361.5	2833.8	3306.2	3778.5	4250.8
0.58	0.75	458.5	917.1	1375.6	1834.1	2292.6	2751.2	3209.7	3668.2	4126.8
0.82	1.06	465.1	930.3	1395.4	1860.5	2325.7	2790.8	3256.9	3721.0	4186.2
0.41	0.73	335.3	670.6	1006.9	1341.3	1676.6	2011.9	2347.2	2682.5	3017.8
0.76	1.21	374.2	748.3	1122.5	1496.7	1870.9	2245.0	2619.2	2993.4	3367.5
0.84	1.01	497.0	994.0	1491.0	1988.0	2485.0	2982.0	3479.0	3976.0	4473.0
0.42	1.25	200.5	401.0	601.5	802.0	1002.6	1203.1	1403.6	1604.1	1804.6
0.87	0.81	642.1	1284.2	1926.3	2568.3	3210.4	3852.5	4494.6	5136.7	5778.8
0.69	0.88	468.9	937.7	1406.6	1875.4	2344.3	2813.1	3282.0	3750.8	4219.7
0.77	1.27	363.2	726.4	1089.5	1452.7	1815.9	2179.1	2542.2	2905.4	3268.6
0.43	0.86	300.0	600.1	900.1	1200.2	1500.2	1800.3	2100.3	2400.4	2700.4
0.78	1.17	396.9	793.8	1190.8	1587.7	1984.6	2381.5	2778.5	3175.4	3572.3
0.83	0.78	633.5	1267.1	1900.6	2534.1	3167.7	3801.2	4434.7	5068.3	5701.8
0.48	0.98	293.0	586.0	879.0	1172.0	1464.9	1757.9	2050.9	2343.9	2636.9
0.76	1.09	415.6	831.2	1246.8	1662.4	2078.0	2493.6	2909.1	3324.7	3740.3
0.57	0.89	381.7	763.5	1145.2	1527.0	1908.7	2290.5	2672.2	3054.0	3435.7
0.81	1.03	469.3	938.7	1408.0	1877.3	2346.7	2816.0	3285.4	3754.7	4224.0

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of .90% Number of Fibers per cc
0.57	1.09	309.4	618.7	928.1	1237.4	1546.8	1856.1	2166.5	2474.8	2784.2
0.69	1.04	398.9	797.7	1196.6	1595.4	1994.3	2393.2	2792.0	3190.9	3589.8
0.78	1.11	421.7	843.5	1265.2	1686.9	2108.6	2530.4	2952.1	3373.8	3795.6
0.42	0.73	345.3	690.5	1035.8	1381.0	1726.3	2071.5	2416.8	2762.0	3107.3
0.59	0.96	371.0	741.9	1112.9	1483.8	1854.8	2225.7	2596.7	2967.6	3338.6
0.61	1.20	301.0	602.0	903.0	1204.1	1505.1	1806.1	2107.1	2408.1	2709.1
0.85	1.11	459.6	919.3	1378.9	1838.6	2298.2	2757.9	3217.5	3677.2	4136.8
0.46	0.88	311.4	622.8	934.2	1245.6	1557.0	1868.3	2179.7	2491.1	2802.5
0.73	0.77	565.2	1130.4	1695.6	2260.8	2826.0	3391.2	3956.4	4521.6	5086.8
0.57	1.34	252.2	504.4	756.7	1008.9	1261.1	1513.3	1765.5	2017.8	2270.0
0.59	0.88	402.1	804.2	1206.2	1608.3	2010.4	2412.5	2814.5	3216.6	3618.7
0.71	0.99	426.7	853.4	1280.0	1706.7	2133.4	2560.1	2986.8	3413.4	3840.1
0.64	1.48	256.5	513.0	769.5	1026.0	1282.5	1539.0	1796.5	2052.0	2308.5
0.76	1.39	326.5	653.0	979.6	1306.1	1632.6	1959.1	2285.7	2612.2	2938.7
0.68	0.74	550.2	1100.5	1650.7	2200.9	2751.2	3301.4	3851.6	4401.9	4952.1
0.60	0.82	438.9	877.8	1316.7	1755.6	2194.5	2633.4	3072.3	3511.2	3950.1
0.81	1.25	385.1	770.3	1155.4	1540.5	1925.6	2310.8	2695.9	3081.0	3466.2
0.52	1.26	247.6	495.3	742.9	990.6	1238.2	1485.8	1733.5	1981.1	2228.8
0.47	1.41	198.8	397.7	596.5	795.4	994.2	1193.0	1391.9	1590.7	1789.5
0.90	1.46	368.0	735.9	1103.9	1471.9	1839.9	2207.8	2575.8	2943.8	3311.8
0.42	1.21	208.5	417.0	625.6	834.1	1042.6	1251.1	1459.6	1668.1	1876.7
0.82	0.91	537.4	1074.7	1612.1	2149.4	2686.8	3224.2	3761.5	4298.9	4836.2
0.74	1.28	343.0	686.0	1028.9	1371.9	1714.9	2057.9	2400.9	2743.8	3086.8
0.87	1.09	475.5	951.0	1426.4	1901.9	2377.4	2852.9	3328.3	3803.8	4279.3
0.47	1.30	214.5	428.9	643.4	857.9	1072.4	1286.8	1501.3	1715.8	1930.3
0.49	1.35	216.4	432.8	649.2	865.6	1082.0	1298.4	1514.8	1731.2	1947.6
0.86	0.91	564.5	1129.0	1693.4	2257.9	2822.4	3386.9	3951.4	4515.8	5080.3
0.47	1.44	194.0	388.1	582.1	776.1	970.2	1164.2	1358.2	1552.3	1746.3
0.61	1.15	315.2	630.4	945.5	1260.7	1575.9	1891.1	2206.3	2521.4	2836.6
0.64	0.82	462.9	925.9	1388.8	1851.7	2314.6	2777.6	3240.5	3703.4	4166.3
0.44	0.85	308.1	616.1	924.2	1232.3	1540.3	1848.4	2156.5	2464.5	2772.6
0.46	0.97	285.4	570.8	856.2	1141.6	1427.0	1712.4	1997.8	2283.2	2568.6
0.65	1.40	276.5	553.1	829.6	1106.2	1382.7	1659.3	1935.8	2212.4	2488.9
0.87	1.07	485.5	971.0	1456.6	1942.1	2427.6	2913.1	3398.6	3884.1	4369.7
0.83	1.36	365.3	730.6	1095.8	1461.1	1826.4	2191.7	2557.0	2922.2	3287.5
0.85	1.10	463.1	926.2	1389.3	1852.4	2315.4	2778.5	3241.6	3704.7	4167.8
0.51	1.04	294.0	587.9	881.9	1175.9	1469.9	1763.8	2057.8	2351.8	2645.8
0.41	1.33	184.3	368.6	552.8	737.1	921.4	1105.7	1289.9	1474.2	1658.5
0.77	1.44	317.5	635.0	952.5	1270.0	1587.5	1905.0	2222.5	2540.0	2857.6
0.71	0.93	455.5	911.1	1366.6	1822.2	2277.7	2733.3	3188.8	3644.4	4099.9
0.55	1.40	233.8	467.6	701.4	935.2	1169.0	1402.8	1636.6	1870.4	2104.2
0.66	1.18	332.2	664.4	996.5	1328.7	1660.9	1993.1	2325.3	2657.5	2989.6
0.80	1.42	337.7	675.5	1013.2	1351.0	1688.7	2026.4	2364.2	2701.9	3039.7
0.74	1.02	431.7	863.4	1295.1	1726.9	2158.6	2590.3	3022.0	3453.7	3885.4
0.73	1.38	316.6	633.2	949.8	1266.5	1583.1	1899.7	2216.3	2532.9	2849.5
0.79	1.19	397.5	795.0	1192.5	1589.9	1987.4	2384.9	2782.4	3179.9	3577.4
0.43	1.18	216.2	432.4	648.6	864.9	1081.1	1297.3	1513.5	1729.7	1945.9
0.61	1.27	287.2	574.5	861.7	1148.9	1436.2	1723.4	2010.6	2297.9	2585.1
0.88	1.38	380.7	761.5	1142.2	1522.9	1903.6	2284.4	2665.1	3045.8	3426.6
0.54	0.93	345.7	691.4	1037.1	1382.7	1728.4	2074.1	2419.8	2765.5	3111.2
0.58	1.46	237.6	475.2	712.7	950.3	1187.9	1425.5	1663.0	1900.6	2138.2
0.44	0.73	359.9	719.8	1079.7	1439.7	1799.6	2159.5	2519.4	2879.3	3239.2
0.60	0.84	423.3	846.7	1270.0	1693.4	2116.7	2540.1	2963.4	3386.7	3810.1
0.55	0.76	431.5	863.1	1294.6	1726.1	2157.7	2589.2	3020.7	3452.3	3883.8
0.78	0.95	491.3	982.6	1473.9	1965.1	2456.4	2947.7	3439.0	3930.3	4421.6
0.47	1.21	232.5	465.1	697.6	930.1	1162.7	1395.2	1627.7	1860.3	2092.8
0.50	1.11	266.2	532.3	798.5	1064.6	1330.8	1596.9	1863.1	2129.3	2395.4
0.65	1.46	265.6	531.2	796.9	1062.5	1328.1	1593.7	1859.3	2125.0	2390.6
0.75	0.74	600.8	1201.6	1802.3	2403.1	3003.9	3604.7	4205.5	4806.3	5407.0
0.78	0.82	569.6	1139.1	1708.7	2278.2	2847.8	3417.3	3986.9	4556.4	5126.0
0.42	0.93	271.6	543.3	814.9	1086.6	1358.2	1629.8	1901.5	2173.1	2444.8
0.84	0.87	576.6	1153.1	1729.7	2306.3	2882.8	3459.4	4035.9	4612.5	5189.1
0.64	0.84	455.0	909.9	1364.9	1819.8	2274.8	2729.8	3184.7	3639.7	4094.6
0.61	0.95	383.5	766.9	1150.4	1533.9	1917.3	2300.8	2684.3	3067.8	3451.2
0.77	1.15	401.1	802.3	1203.4	1604.5	2005.6	2406.8	2807.9	3209.0	3610.2
0.84	0.85	587.8	1175.5	1763.3	2351.0	2938.8	3526.6	4114.3	4702.1	5289.8
0.82	1.03	472.1	944.1	1416.2	1888.3	2360.3	2832.4	3304.5	3776.5	4248.6
0.61	0.87	416.6	833.3	1249.9	1666.5	2083.2	2499.8	2916.4	3333.1	3749.7
0.56	1.10	300.2	600.3	900.5	1200.6	1500.8	1800.9	2101.1	2401.2	2701.4
0.51	1.29	234.7	469.4	704.1	938.8	1173.5	1408.2	1642.9	1877.6	2112.3
0.80	1.37	350.0	700.1	1050.1	1400.2	1750.2	2100.2	2450.3	2800.3	3150.4
0.62	0.99	372.5	745.0	1117.6	1490.1	1862.6	2235.1	2607.6	2980.1	3352.7
0.85	0.86	592.0	1183.9	1775.9	2367.9	2959.8	3551.8	4143.8	4735.7	5327.7
0.49	0.85	343.4	686.8	1030.2	1373.6	1717.0	2060.3	2403.7	2747.1	3090.5
0.72	0.74	580.3	1160.7	1741.0	2321.4	2901.7	3482.1	4062.4	4642.7	5223.1
0.80	1.00	475.3	950.6	1425.9	1901.2	2376.5	2851.8	3327.1	3802.4	4277.7
0.77	1.30	353.1	706.3	1059.4	1412.6	1765.7	2118.9	2472.0	2825.2	3178.3
0.42	1.31	193.5	387.0	580.4	773.9	967.4	1160.9	1354.4	1547.8	1741.3
0.50	0.95	316.5	633.0	949.4	1265.9	1582.4	1898.9	2215.4	2531.9	2848.3
0.67	1.15	348.4	696.7	1045.1	1393.5	1741.9	2090.2	2438.6	2787.0	3135.4
0.65	1.31	295.1	590.1	885.2	1180.3	1475.3	1770.4	2065.4	2360.5	2655.6
0.44	1.36	195.4	390.9	586.3	781.8	977.2	1172.7	1368.1	1563.5	1759.0
0.62	1.18	314.2	628.3	942.5	1256.6	1570.8	1885.0	2199.1	2513.3	2827.4
0.90	0.78	690.0	1380.0	2070.0	2759.9	3449.9	4139.9	4829.9	5519.9	6209.9
0.45	1.27	212.8	425.6	638.4	851.2	1064.0	1276.8	1489.6	1702.4	1915.2
0.47	0.90	310.9	621.8	932.7	1243.7	1554.6	1865.5	2176.4	2487.3	2798.2
0.57	1.32	258.4	516.8	775.2	1033.6	1291.9	1550.3	1808.7	2067.1	2325.5
0.43	0.91	280.1	560.2	840.2	1120.3	1400.4	1680.5	1960.6	2240.7	2520.7
0.73	1.14	382.5	765.1	1147.6	1530.2	1912.7	2295.2	2677.8	3060.3	3442.9

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of 0.50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of 0.90%, Number of Fibers per cc
0.46	0.94	282.5	564.9	847.4	1129.9	1412.3	1694.8	1977.3	2259.7	2542.2
0.49	0.87	338.8	677.6	1016.3	1355.1	1693.9	2032.7	2371.5	2710.3	3049.0
0.76	0.96	476.4	952.8	1429.2	1906.6	2382.0	2858.4	3334.9	3811.3	4287.7
0.59	0.82	429.2	858.3	1287.5	1716.7	2145.8	2575.0	3004.2	3433.3	3862.5
0.49	1.48	198.3	396.7	595.0	793.3	991.7	1190.0	1388.3	1586.6	1785.0
0.48	1.18	241.2	482.3	723.5	964.6	1205.8	1446.9	1688.1	1929.3	2170.4
0.46	1.02	269.0	538.0	807.1	1076.1	1345.1	1614.1	1883.1	2152.1	2421.2
0.45	1.21	220.1	440.3	660.4	880.5	1100.7	1320.8	1540.9	1761.0	1981.2
0.68	1.14	356.9	713.9	1070.8	1427.7	1784.7	2141.6	2498.5	2855.5	3212.4
0.59	1.22	285.3	570.6	855.8	1141.1	1426.4	1711.7	1996.9	2282.2	2567.5
0.77	0.96	482.0	963.9	1445.9	1927.8	2409.8	2891.7	3373.7	3855.7	4337.6
0.61	1.04	349.1	698.3	1047.4	1396.5	1745.7	2094.8	2443.9	2793.1	3142.2
0.87	0.82	635.6	1271.1	1906.7	2542.2	3177.8	3813.3	4448.9	5084.4	5720.0
0.63	1.02	370.3	740.6	1111.0	1481.3	1851.6	2221.9	2592.2	2962.5	3332.9
0.79	0.87	541.6	1083.3	1624.9	2166.6	2708.2	3249.9	3791.5	4333.2	4874.8
0.41	1.47	167.0	334.1	501.1	668.1	835.2	1002.2	1169.2	1336.3	1503.3
0.85	0.76	670.4	1340.7	2011.1	2681.4	3351.8	4022.2	4692.5	5362.9	6033.2
0.63	1.07	353.5	707.1	1060.6	1414.2	1767.7	2121.3	2474.8	2828.3	3181.9
0.69	0.91	448.0	895.9	1343.9	1791.9	2239.9	2687.8	3135.8	3583.8	4031.8
0.47	0.70	402.6	805.2	1207.8	1610.4	2013.1	2415.7	2818.3	3220.9	3623.5
0.65	1.25	312.0	623.9	935.9	1247.9	1559.9	1871.8	2183.8	2495.8	2807.8
0.57	0.99	344.7	689.3	1034.0	1378.6	1723.3	2067.9	2412.6	2757.2	3101.9
0.43	1.06	242.7	485.5	728.2	971.0	1213.7	1456.5	1699.2	1942.0	2184.7
0.78	1.03	453.1	906.2	1359.2	1812.3	2265.4	2718.5	3171.5	3624.6	4077.7
0.84	1.18	428.3	856.6	1284.9	1713.2	2141.5	2569.8	2998.1	3426.4	3854.6
0.41	0.87	280.5	561.1	841.6	1122.1	1402.6	1683.2	1963.7	2244.2	2524.8
0.42	0.86	291.1	582.2	873.3	1164.4	1455.5	1746.5	2037.6	2328.7	2619.8
0.66	0.88	444.4	888.8	1333.2	1777.6	2222.0	2666.4	3110.9	3555.3	3999.7
0.70	0.75	550.3	1100.7	1651.0	2201.3	2751.6	3302.0	3852.3	4402.6	4952.9
0.88	1.14	460.3	920.6	1380.9	1841.2	2301.5	2761.8	3222.1	3682.4	4142.7
0.54	0.96	334.2	668.4	1002.7	1336.9	1671.1	2005.3	2339.6	2673.8	3008.0
0.86	0.83	625.2	1250.5	1875.7	2501.0	3126.2	3751.5	4376.7	5002.0	5627.2
0.42	0.86	292.2	584.4	876.6	1168.8	1461.0	1753.1	2045.3	2337.5	2629.7
0.59	1.50	235.8	471.6	707.4	943.1	1178.9	1414.7	1650.5	1886.3	2122.1
0.51	1.37	222.4	444.9	667.3	889.7	1112.2	1334.6	1557.1	1779.5	2001.9
0.87	0.79	656.3	1312.6	1968.9	2625.2	3281.5	3937.8	4594.1	5250.4	5906.7
0.46	1.40	194.0	387.9	581.9	775.8	969.8	1163.8	1357.7	1551.7	1745.6
0.46	1.01	271.9	543.8	815.6	1087.5	1359.4	1631.3	1903.2	2175.0	2446.9
	Averages:	374	748	1123	1497	1871	2245	2620	2994	3368

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 25' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
25*25*8	Dimensions of Room (Ft)	14160000	Room Volume in Cubic Centimeters
5000	Cubic Footage of Room	743200	Wall Area in Room in Square Centimeters
800	Wall Area of Room (Sq FT)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	8	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft of wall)	4.8	Gallons of ACJC Applied to Walls
		18168	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume within ACJC, Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.40	0.79	242.4	484.8	727.2	969.7	1212.1	1454.5	1696.9	1939.3	2181.7
0.58	1.23	224.6	449.3	673.9	898.5	1123.2	1347.8	1572.4	1797.1	2021.7
0.63	0.88	340.8	681.5	1022.3	1363.1	1703.8	2044.6	2385.4	2726.1	3066.9
0.62	1.36	219.9	439.8	659.7	879.6	1099.4	1319.3	1539.2	1759.1	1979.0
0.83	0.74	536.1	1072.2	1608.4	2144.5	2680.6	3216.7	3752.9	4289.0	4825.1
0.48	0.86	265.1	530.3	795.4	1060.5	1325.6	1590.8	1855.9	2121.0	2386.1
0.43	0.76	270.1	540.3	810.4	1080.5	1350.7	1620.8	1890.9	2161.0	2431.2
0.61	1.10	262.8	525.6	788.3	1051.1	1313.9	1576.7	1839.5	2102.2	2365.0
0.64	1.17	260.0	520.0	779.9	1039.9	1299.9	1559.9	1819.9	2079.8	2339.8
0.61	0.80	368.1	736.3	1104.4	1472.6	1840.7	2208.9	2577.0	2945.2	3313.3
0.90	1.35	318.2	636.4	954.6	1272.8	1591.0	1909.2	2227.4	2545.6	2863.9
0.86	0.99	414.1	828.1	1242.2	1656.2	2070.3	2484.4	2898.4	3312.5	3726.5
0.43	1.43	143.7	287.4	431.1	574.8	718.5	862.3	1006.0	1149.7	1293.4
0.50	0.74	326.1	652.3	978.4	1304.5	1630.7	1956.8	2283.0	2609.1	2935.2
0.76	1.22	297.6	595.3	892.9	1190.6	1488.2	1785.9	2083.5	2381.2	2678.8
0.73	0.84	410.7	821.4	1232.1	1642.8	2053.5	2464.2	2874.8	3285.5	3696.2
0.40	0.72	[illegible]	537.1	805.7	1074.2	1342.8	1611.3	1879.9	2148.5	2417.0
0.55	0.96	271.7	543.3	815.0	1086.7	1358.3	1630.0	1901.7	2173.3	2445.0
0.56	1.40	192.4	384.8	577.1	769.5	961.9	1154.3	1346.7	1539.1	1731.4
0.48	1.08	212.4	424.8	637.1	849.5	1061.9	1274.3	1486.7	1699.0	1911.4
0.69	1.21	271.4	542.9	814.3	1085.8	1357.2	1628.7	1900.1	2171.5	2443.0
0.84	1.16	342.9	685.9	1028.8	1371.8	1714.7	2057.7	2400.6	2743.6	3086.5
0.89	1.46	292.9	585.8	878.8	1171.7	1464.6	1757.5	2050.4	2343.3	2636.3
0.58	1.07	256.7	513.3	770.0	1026.7	1283.4	1540.0	1796.7	2053.4	2310.0
0.59	1.42	200.0	400.0	600.0	800.0	1000.0	1200.0	1400.0	1600.0	1800.1
0.67	1.14	280.6	561.1	841.7	1122.3	1402.8	1683.4	1964.0	2244.5	2525.1
0.85	1.11	364.6	729.2	1093.9	1458.5	1823.1	2187.7	2552.3	2917.0	3281.6
0.49	0.78	301.7	603.5	905.2	1206.9	1508.6	1810.4	2112.1	2413.8	2715.5
0.65	1.37	226.4	452.7	679.1	905.4	1131.8	1358.1	1584.5	1810.8	2037.2
0.83	1.49	267.2	534.5	801.7	1068.9	1336.2	1603.4	1870.6	2137.9	2405.1
0.77	1.01	363.9	727.9	1091.8	1455.7	1819.6	2183.6	2547.5	2911.4	3275.3
0.81	0.83	463.7	927.4	1391.2	1854.9	2318.6	2782.3	3246.0	3709.8	4173.5
0.42	1.25	158.6	317.2	475.9	634.5	793.1	951.7	1110.3	1269.0	1427.6
0.88	1.24	339.5	679.0	1018.6	1358.1	1697.6	2037.1	2376.6	2716.2	3055.7
0.48	0.80	284.6	569.1	853.7	1138.3	1422.9	1707.4	1992.0	2276.6	2561.2
0.42	1.37	144.9	289.8	434.6	579.5	724.4	869.3	1014.1	1159.0	1303.9
0.52	0.74	333.6	667.2	1000.8	1334.4	1668.0	2001.6	2335.2	2668.8	3002.4
0.44	0.91	233.1	466.2	699.3	932.3	1165.4	1398.5	1631.6	1864.7	2097.8
0.88	0.80	528.5	1057.0	1585.5	2114.1	2642.6	3171.1	3699.6	4228.1	4756.6
0.42	1.06	190.4	380.9	571.3	761.7	952.1	1142.6	1333.0	1523.4	1713.8
0.84	1.43	281.9	563.8	845.7	1127.6	1409.5	1691.4	1973.3	2255.2	2537.1
0.84	0.77	522.6	1045.2	1567.7	2090.3	2612.9	3135.5	3658.1	4180.6	4703.2
0.72	1.30	264.9	529.9	794.8	1059.8	1324.7	1589.6	1854.6	2119.5	2384.5
0.77	0.80	460.9	921.8	1382.7	1843.6	2304.5	2765.4	3226.3	3687.2	4148.1
0.88	1.20	352.9	705.7	1058.6	1411.5	1764.4	2117.2	2470.1	2823.0	3175.9
0.50	1.20	198.5	397.1	595.6	794.1	992.7	1191.2	1389.7	1588.3	1786.8
0.87	1.27	329.1	658.2	987.3	1316.5	1645.6	1974.7	2303.8	2632.9	2962.0
0.59	1.47	193.0	386.1	579.1	772.1	965.2	1158.2	1351.2	1544.3	1737.3
0.63	1.33	227.3	454.6	681.9	909.2	1136.5	1363.8	1591.1	1818.4	2045.7
0.44	1.25	166.5	332.9	499.4	665.9	832.4	998.8	1165.3	1331.8	1498.3
0.45	1.46	147.8	295.7	443.5	591.3	739.2	887.0	1034.8	1182.7	1330.5
0.77	0.95	388.2	776.5	1164.7	1552.9	1941.2	2329.4	2717.7	3105.9	3494.1
0.53	0.83	305.0	609.9	914.9	1219.9	1524.8	1829.8	2134.8	2439.7	2744.7
0.86	0.80	508.5	1017.0	1525.5	2034.0	2542.5	3051.0	3559.5	4068.0	4576.5
0.62	0.96	305.4	610.7	916.1	1221.4	1526.8	1832.2	2137.5	2442.9	2748.2
0.82	0.73	532.0	1064.0	1596.0	2128.0	2660.1	3192.1	3724.1	4256.1	4788.1
0.89	1.12	377.8	755.7	1133.5	1511.4	1889.2	2267.1	2644.9	3022.8	3400.6
0.58	0.75	366.8	733.6	1100.5	1467.3	1834.1	2200.9	2567.8	2934.6	3301.4
0.82	1.05	372.1	744.2	1116.3	1488.4	1860.5	2232.6	2604.7	2976.8	3348.9
0.41	0.73	268.3	536.5	804.8	1073.0	1341.3	1609.5	1877.8	2146.0	2414.3
0.76	1.21	299.3	598.7	898.0	1197.3	1496.7	1796.0	2095.4	2394.7	2694.0
0.84	1.01	397.6	795.2	1192.8	1590.4	1988.0	2385.6	2783.2	3180.8	3578.4
0.42	1.25	160.4	320.8	481.2	641.6	802.0	962.5	1122.9	1283.3	1443.7
0.87	0.81	513.7	1027.3	1541.0	2054.7	2568.3	3082.0	3595.7	4109.3	4623.0
0.69	0.88	375.1	750.2	1125.3	1500.3	1875.4	2250.5	2625.6	3000.7	3375.8
0.77	1.27	290.5	581.1	871.6	1162.2	1452.7	1743.2	2033.8	2324.3	2614.9
0.43	0.86	240.0	480.1	720.1	960.2	1200.2	1440.2	1680.3	1920.3	2160.3
0.78	1.17	317.5	635.1	952.6	1270.1	1587.7	1905.2	2222.8	2540.3	2857.8
0.83	0.78	506.8	1013.7	1520.5	2027.3	2534.1	3041.0	3547.8	4054.6	4561.5
0.48	0.98	234.4	468.8	703.2	937.6	1172.0	1406.3	1640.7	1875.1	2109.5
0.76	1.09	332.5	664.9	997.4	1329.9	1662.4	1994.8	2327.3	2659.8	2992.3
0.57	0.89	305.4	610.8	916.2	1221.6	1527.0	1832.4	2137.8	2443.2	2748.6
0.81	1.03	375.5	750.9	1126.4	1501.9	1877.3	2252.8	2628.3	3003.8	3379.2

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of 90%, Number of Fibers per cc
0.57	1.09	247.5	495.0	742.4	989.9	1237.4	1484.9	1732.4	1979.8	2227.3
0.69	1.04	319.1	638.2	957.3	1276.4	1595.4	1914.5	2233.6	2552.7	2871.8
0.78	1.11	337.4	674.8	1012.1	1349.5	1686.9	2024.3	2361.7	2699.1	3036.4
0.42	0.73	276.2	552.4	828.6	1104.8	1381.0	1657.2	1933.4	2209.6	2485.8
0.59	0.95	296.8	593.5	890.3	1187.0	1483.8	1780.6	2077.3	2374.1	2670.9
0.61	1.20	240.8	481.6	722.4	963.2	1204.1	1444.9	1685.7	1926.5	2167.3
0.85	1.11	367.7	735.4	1103.2	1470.9	1838.6	2206.3	2574.0	2941.8	3309.5
0.46	0.88	249.1	498.2	747.3	996.4	1245.6	1494.7	1743.8	1992.9	2242.0
0.73	0.77	452.2	904.3	1356.5	1808.7	2260.8	2713.0	3165.1	3617.3	4069.5
0.57	1.34	201.8	403.6	605.3	807.1	1008.9	1210.7	1412.4	1614.2	1816.0
0.59	0.88	321.7	643.3	965.0	1286.6	1608.3	1930.0	2251.6	2573.3	2895.0
0.71	0.99	341.3	682.7	1024.0	1365.4	1706.7	2048.1	2389.4	2730.8	3072.1
0.64	1.48	205.2	410.4	615.6	820.8	1026.0	1231.2	1436.4	1641.6	1846.8
0.76	1.39	261.2	522.4	783.7	1044.9	1306.1	1567.3	1828.5	2089.7	2351.0
0.68	0.74	440.2	880.4	1320.6	1760.8	2200.9	2641.1	3081.3	3521.5	3961.7
0.60	0.82	351.1	702.2	1053.4	1404.5	1755.6	2106.7	2457.9	2809.0	3160.1
0.81	1.25	308.1	616.2	924.3	1232.4	1540.5	1848.6	2156.7	2464.8	2772.9
0.52	1.26	198.1	396.2	594.3	792.4	990.6	1188.7	1386.8	1584.9	1783.0
0.47	1.41	159.1	318.1	477.2	636.3	795.4	954.4	1113.5	1272.6	1431.6
0.90	1.46	294.4	588.8	883.1	1177.5	1471.9	1766.3	2060.6	2355.0	2649.4
0.42	1.21	166.8	333.6	500.4	667.3	834.1	1000.9	1167.7	1334.5	1501.3
0.82	0.91	429.9	859.8	1289.7	1719.5	2149.4	2579.3	3009.2	3439.1	3869.0
0.74	1.28	274.4	548.8	823.1	1097.5	1371.9	1646.3	1920.7	2195.1	2469.4
0.87	1.09	380.4	760.8	1141.1	1521.5	1901.9	2282.3	2662.7	3043.1	3423.4
0.47	1.30	171.6	343.2	514.7	686.3	857.9	1029.5	1201.1	1372.6	1544.2
0.49	1.35	173.1	346.2	519.4	692.5	865.6	1038.7	1211.8	1384.9	1558.1
0.86	0.91	451.6	903.2	1354.7	1806.3	2257.9	2709.5	3161.1	3612.7	4064.2
0.47	1.44	155.2	310.5	465.7	620.9	776.1	931.4	1086.6	1241.8	1397.0
0.61	1.15	252.1	504.3	756.4	1008.6	1260.7	1512.9	1765.0	2017.2	2269.3
0.64	0.82	370.3	740.7	1111.0	1481.4	1851.7	2222.0	2592.4	2962.7	3333.1
0.44	0.85	246.5	492.9	739.4	985.8	1232.3	1478.7	1725.2	1971.6	2218.1
0.46	0.97	228.3	456.6	685.0	913.3	1141.6	1369.9	1598.3	1826.6	2054.9
0.65	1.40	221.2	442.5	663.7	884.9	1106.2	1327.4	1548.7	1769.9	1991.1
0.87	1.07	388.4	776.8	1165.2	1553.7	1942.1	2330.5	2718.9	3107.3	3495.7
0.83	1.36	292.2	584.4	876.7	1168.9	1461.1	1753.3	2045.6	2337.8	2630.0
0.85	1.10	370.5	740.9	1111.4	1481.9	1852.4	2222.8	2593.3	2963.8	3334.2
0.51	1.04	235.2	470.4	705.5	940.7	1175.9	1411.1	1646.2	1881.4	2116.6
0.41	1.33	147.4	294.8	442.3	589.7	737.1	884.5	1031.9	1179.4	1326.8
0.77	1.44	254.0	508.0	762.0	1016.0	1270.0	1524.0	1778.0	2032.0	2286.0
0.71	0.93	364.4	728.9	1093.3	1457.8	1822.2	2186.6	2551.1	2915.5	3280.0
0.55	1.40	187.0	374.1	561.1	748.2	935.2	1122.3	1309.3	1496.3	1683.4
0.66	1.18	265.7	531.5	797.2	1063.0	1328.7	1594.5	1860.2	2126.0	2391.7
0.80	1.42	270.2	540.4	810.6	1080.8	1351.0	1621.2	1891.3	2161.5	2431.7
0.74	1.02	345.4	690.7	1036.1	1381.5	1726.9	2072.2	2417.6	2763.0	3108.3
0.73	1.38	253.3	506.6	759.9	1013.2	1266.5	1519.8	1773.0	2026.3	2279.6
0.79	1.19	318.0	636.0	954.0	1271.9	1589.9	1907.9	2225.9	2543.9	2861.9
0.43	1.18	173.0	345.9	518.9	691.9	864.9	1037.8	1210.8	1383.8	1556.8
0.61	1.27	229.8	459.6	689.4	919.1	1148.9	1378.7	1608.5	1838.3	2068.1
0.88	1.38	304.6	609.2	913.7	1218.3	1522.9	1827.5	2132.1	2436.7	2741.2
0.54	0.93	276.5	553.1	829.6	1106.2	1382.7	1659.3	1935.8	2212.4	2488.9
0.58	1.46	190.1	380.1	570.2	760.2	950.3	1140.4	1330.4	1520.5	1710.6
0.44	0.73	287.9	575.9	863.8	1151.7	1439.7	1727.6	2015.5	2303.5	2591.4
0.60	0.84	338.7	677.3	1016.0	1354.7	1693.4	2032.0	2370.7	2709.4	3048.1
0.55	0.76	345.2	690.5	1035.7	1380.9	1726.1	2071.4	2416.6	2761.8	3107.0
0.78	0.95	393.0	786.1	1179.1	1572.1	1965.1	2358.2	2751.2	3144.2	3537.3
0.47	1.21	186.0	372.1	558.1	744.1	930.1	1116.2	1302.2	1488.2	1674.3
0.50	1.11	212.9	425.9	638.8	851.7	1064.6	1277.6	1490.5	1703.4	1916.3
0.65	1.46	212.5	425.0	637.5	850.0	1062.5	1275.0	1487.5	1700.0	1912.5
0.75	0.74	480.6	961.3	1441.9	1922.5	2403.1	2883.8	3364.4	3845.0	4325.6
0.78	0.82	455.6	911.3	1366.9	1822.6	2278.2	2733.9	3189.5	3645.2	4100.8
0.42	0.93	217.3	434.6	651.9	869.2	1086.6	1303.9	1521.2	1738.5	1955.8
0.84	0.87	461.3	922.5	1383.8	1845.0	2306.3	2767.5	3228.8	3690.0	4151.3
0.64	0.84	364.0	727.9	1091.9	1455.9	1819.8	2183.8	2547.8	2911.7	3275.7
0.61	0.95	306.8	613.6	920.3	1227.1	1533.9	1840.7	2147.4	2454.2	2761.0
0.77	1.15	320.9	641.8	962.7	1283.6	1604.5	1925.4	2246.3	2567.2	2888.1
0.84	0.85	470.2	940.4	1410.6	1880.8	2351.0	2821.3	3291.5	3761.7	4231.9
0.82	1.03	377.7	755.3	1133.0	1510.6	1888.3	2265.9	2643.6	3021.2	3398.9
0.61	0.87	333.3	666.6	999.9	1333.2	1666.5	1999.8	2333.1	2666.4	2999.7
0.56	1.10	240.1	480.2	720.4	960.5	1200.6	1440.7	1680.9	1921.0	2161.1
0.51	1.29	187.8	375.5	563.3	751.1	938.8	1126.6	1314.3	1502.1	1689.9
0.80	1.37	280.0	560.1	840.1	1120.1	1400.2	1680.2	1960.2	2240.3	2520.3
0.62	0.99	298.0	596.0	894.0	1192.1	1490.1	1788.1	2086.1	2384.1	2682.1
0.85	0.86	473.6	947.1	1420.7	1894.3	2367.9	2841.4	3315.0	3788.6	4262.2
0.49	0.85	274.7	549.4	824.1	1098.8	1373.6	1648.3	1923.0	2197.7	2472.4
0.72	0.74	464.3	928.5	1392.8	1857.1	2321.4	2785.6	3249.9	3714.2	4178.5
0.80	1.00	380.2	760.5	1140.7	1521.0	1901.2	2281.5	2661.7	3041.9	3422.2
0.77	1.30	282.5	565.0	847.5	1130.1	1412.6	1695.1	1977.6	2260.1	2542.6
0.42	1.31	154.8	309.6	464.4	619.1	773.9	928.7	1083.5	1238.3	1393.1
0.50	0.95	253.2	506.4	759.6	1012.7	1265.9	1519.1	1772.3	2025.5	2278.7
0.67	1.15	278.7	557.4	836.1	1114.8	1393.5	1672.2	1950.9	2229.6	2508.3
0.66	1.31	236.1	472.1	708.2	944.2	1180.3	1416.3	1652.4	1888.4	2124.5
0.44	1.36	156.4	312.7	469.1	625.4	781.8	938.1	1094.5	1250.8	1407.2
0.62	1.18	251.3	502.7	754.0	1005.3	1256.6	1508.0	1759.3	2010.6	2262.0
0.90	0.78	552.0	1104.0	1656.0	2208.0	2759.9	3311.9	3863.9	4415.9	4967.9
0.45	1.27	170.2	340.5	510.7	681.0	851.2	1021.4	1191.7	1361.9	1532.2
0.47	0.90	248.7	497.5	746.2	994.9	1243.7	1492.4	1741.1	1989.8	2238.6
0.57	1.32	206.7	413.4	620.1	826.8	1033.6	1240.3	1447.0	1653.7	1860.4
0.43	0.91	224.1	448.1	672.2	896.3	1120.3	1344.4	1568.5	1792.5	2016.6
0.73	1.14	306.0	612.1	918.1	1224.1	1530.2	1836.2	2142.2	2448.3	2754.3

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.46	0.94	226.0	451.9	677.9	903.9	1129.9	1355.8	1581.8	1807.8	2033.8
0.49	0.87	271.0	542.1	813.1	1084.1	1355.1	1626.2	1897.2	2168.2	2439.2
0.76	0.95	381.1	762.3	1143.4	1524.5	1905.6	2286.8	2667.9	3049.0	3430.1
0.59	0.82	343.3	686.7	1030.0	1373.3	1716.7	2060.0	2403.3	2746.7	3090.0
0.49	1.48	158.7	317.3	476.0	634.7	793.3	952.0	1110.6	1269.3	1428.0
0.48	1.18	192.9	385.9	578.8	771.7	964.6	1157.6	1350.5	1543.4	1736.3
0.46	1.02	215.2	430.4	645.6	860.9	1076.1	1291.3	1506.5	1721.7	1936.9
0.45	1.21	176.1	352.2	528.3	704.4	880.5	1056.6	1232.7	1408.8	1584.9
0.68	1.14	285.5	571.1	856.6	1142.2	1427.7	1713.3	1998.8	2284.4	2569.9
0.59	1.22	228.2	456.4	684.7	912.9	1141.1	1369.3	1597.5	1825.8	2054.0
0.77	0.96	385.6	771.1	1156.7	1542.3	1927.8	2313.4	2699.0	3084.5	3470.1
0.61	1.04	279.3	558.6	837.9	1117.2	1396.5	1675.8	1955.2	2234.5	2513.8
0.87	0.82	508.4	1016.9	1525.3	2033.8	2542.2	3050.6	3559.1	4067.5	4576.0
0.63	1.02	296.3	592.5	888.8	1185.0	1481.3	1777.5	2073.8	2370.0	2666.3
0.79	0.87	433.3	866.6	1300.0	1733.3	2166.6	2599.9	3033.2	3466.5	3899.9
0.41	1.47	133.6	267.3	400.9	534.5	668.1	801.8	936.4	1069.0	1202.6
0.85	0.76	536.3	1072.6	1608.9	2145.1	2681.4	3217.7	3754.0	4290.3	4826.6
0.63	1.07	282.8	565.7	848.5	1131.3	1414.2	1697.0	1979.8	2262.7	2545.5
0.69	0.91	358.4	716.8	1075.1	1433.5	1791.9	2150.3	2508.7	2867.0	3225.4
0.47	0.70	322.1	644.2	966.3	1288.4	1610.4	1932.5	2254.6	2576.7	2898.8
0.65	1.25	249.6	499.2	748.7	998.3	1247.9	1497.5	1747.1	1996.6	2246.2
0.57	0.99	275.7	551.4	827.2	1102.9	1378.6	1654.3	1930.1	2205.8	2481.5
0.43	1.06	194.2	388.4	582.6	776.8	971.0	1165.2	1359.4	1553.6	1747.8
0.78	1.03	362.5	724.9	1087.4	1449.8	1812.3	2174.8	2537.2	2899.7	3262.2
0.84	1.18	342.6	685.3	1027.9	1370.5	1713.2	2055.8	2398.4	2741.1	3083.7
0.41	0.87	224.4	448.8	673.3	897.7	1122.1	1346.5	1571.0	1795.4	2019.8
0.42	0.86	232.9	465.7	698.6	931.5	1164.4	1397.2	1630.1	1863.0	2095.9
0.66	0.88	355.5	711.1	1066.6	1422.1	1777.6	2133.2	2488.7	2844.2	3199.7
0.70	0.75	440.3	880.5	1320.8	1761.0	2201.3	2641.6	3081.8	3522.1	3962.3
0.88	1.14	368.2	736.5	1104.7	1473.0	1841.2	2209.5	2577.7	2945.9	3314.2
0.54	0.96	267.4	534.8	802.1	1069.5	1336.9	1604.3	1871.7	2139.0	2406.4
0.86	0.83	500.2	1000.4	1500.6	2000.8	2501.0	3001.2	3501.4	4001.6	4501.8
0.42	0.86	233.8	467.5	701.3	935.0	1168.8	1402.5	1636.3	1870.0	2103.8
0.59	1.50	188.6	377.3	565.9	754.5	943.1	1131.8	1320.4	1509.0	1697.6
0.51	1.37	177.9	355.9	533.8	711.8	889.7	1067.7	1245.6	1423.6	1601.5
0.87	0.79	525.0	1050.1	1575.1	2100.2	2625.2	3150.2	3675.3	4200.3	4725.3
0.46	1.40	155.2	310.3	465.5	620.7	775.8	931.0	1086.2	1241.3	1396.5
0.46	1.01	217.5	435.0	652.5	870.0	1087.5	1305.0	1522.5	1740.0	1957.5
	Averages:	299	599	898	1197	1497	1796	2096	2395	2694

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 30' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
30*25*8	Dimensions of Room (Ft)	169920000	Room Volume in Cubic Centimeters
6000	Cubic Footage of Room	817520	Wall Area in Room in Square Centimeters
880	Wall Area of Room (Sq FT)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	8.8	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft of wall)	5.28	Gallons of ACJC Applied to Walls
		19984.8	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume within ACJC, Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of 90%, Number of Fibers per cc
0.40	0.79	202.0	404.0	606.0	808.0	1010.1	1212.1	1414.1	1616.1	1818.1
0.58	1.23	187.2	374.4	561.6	748.8	936.0	1123.2	1310.4	1497.6	1684.7
0.63	0.88	284.0	567.9	851.9	1135.9	1419.9	1703.8	1987.8	2271.8	2555.7
0.62	1.36	183.2	366.5	549.7	733.0	916.2	1099.4	1282.7	1465.9	1649.2
0.83	0.74	446.8	893.5	1340.3	1787.1	2233.8	2680.6	3127.4	3574.2	4020.9
0.48	0.86	220.9	441.9	662.8	883.8	1104.7	1325.6	1546.6	1767.5	1988.5
0.43	0.76	225.1	450.2	675.3	900.4	1125.5	1350.7	1575.8	1800.9	2026.0
0.61	1.10	219.0	438.0	656.9	875.9	1094.9	1313.9	1532.9	1751.9	1970.8
0.64	1.17	216.6	433.3	649.9	866.6	1083.2	1299.9	1516.5	1733.2	1949.8
0.61	0.80	306.8	613.6	920.4	1227.2	1533.9	1840.7	2147.5	2454.3	2761.1
0.90	1.35	265.2	530.3	795.5	1060.7	1325.9	1591.0	1856.2	2121.4	2386.5
0.86	0.99	345.0	690.1	1035.1	1380.2	1725.2	2070.3	2415.3	2760.4	3105.4
0.43	1.43	119.8	239.5	359.3	479.0	598.8	718.5	838.3	958.1	1077.8
0.50	0.74	271.8	543.6	815.3	1087.1	1358.9	1630.7	1902.5	2174.2	2446.0
0.76	1.22	248.0	496.1	744.1	992.2	1240.2	1488.2	1736.3	1984.3	2232.3
0.73	0.84	342.2	684.5	1026.7	1369.0	1711.2	2053.5	2395.7	2738.0	3080.2
0.40	0.72	223.8	447.6	671.4	895.2	1119.0	1342.8	1566.6	1790.4	2014.2
0.55	0.96	226.4	452.8	679.2	905.6	1131.9	1358.3	1584.7	1811.1	2037.5
0.56	1.40	160.3	320.6	481.0	641.3	801.6	961.9	1122.2	1282.6	1442.9
0.48	1.08	177.0	354.0	530.9	707.9	884.9	1061.9	1238.9	1415.9	1592.8
0.69	1.21	226.2	452.4	678.6	904.8	1131.0	1357.2	1583.4	1809.6	2035.8
0.84	1.16	285.8	571.6	857.4	1143.2	1428.9	1714.7	2000.5	2286.3	2572.1
0.89	1.46	244.1	488.2	732.3	976.4	1220.5	1464.6	1708.7	1952.8	2196.9
0.58	1.07	213.9	427.8	641.7	855.6	1069.5	1283.4	1497.3	1711.1	1925.0
0.59	1.42	166.7	333.3	500.0	666.7	833.4	1000.0	1166.7	1333.4	1500.0
0.67	1.14	233.8	467.6	701.4	935.2	1169.0	1402.8	1636.6	1870.5	2104.3
0.85	1.11	303.8	607.7	911.5	1215.4	1519.2	1823.1	2126.9	2430.8	2734.6
0.49	0.78	251.4	502.9	754.3	1005.8	1257.2	1508.6	1760.1	2011.5	2262.9
0.65	1.37	188.6	377.3	565.9	754.5	943.1	1131.8	1320.4	1509.0	1697.6
0.83	1.49	222.7	445.4	668.1	890.8	1113.5	1336.2	1558.9	1781.6	2004.3
0.77	1.01	303.3	606.5	909.8	1213.1	1516.4	1819.6	2122.9	2426.2	2729.4
0.81	0.83	386.4	772.9	1159.3	1545.7	1932.2	2318.6	2705.0	3091.5	3477.9
0.42	1.25	132.2	264.4	396.6	528.7	660.9	793.1	925.3	1057.5	1189.7
0.88	1.24	282.9	565.9	848.8	1131.7	1414.7	1697.6	1980.5	2263.5	2546.4
0.48	0.80	237.1	474.3	711.4	948.6	1185.7	1422.9	1660.0	1897.2	2134.3
0.42	1.37	120.7	241.5	362.2	482.9	603.7	724.4	845.1	965.9	1086.6
0.52	0.74	278.0	556.0	834.0	1112.0	1390.0	1668.0	1946.0	2224.0	2502.0
0.44	0.91	194.2	388.5	582.7	777.0	971.2	1165.4	1359.7	1553.9	1748.1
0.88	0.80	440.4	880.9	1321.3	1761.7	2202.1	2642.6	3083.0	3523.4	3963.9
0.42	1.06	158.7	317.4	476.1	634.8	793.4	952.1	1110.8	1269.5	1428.2
0.84	1.43	234.9	469.8	704.7	939.6	1174.6	1409.5	1644.4	1879.3	2114.2
0.84	0.77	435.5	871.0	1306.4	1741.9	2177.4	2612.9	3048.4	3483.9	3919.3
0.72	1.30	220.8	441.6	662.4	883.1	1103.9	1324.7	1545.5	1766.3	1987.1
0.77	0.80	384.1	768.2	1152.2	1536.3	1920.4	2304.5	2688.6	3072.6	3456.7
0.88	1.20	294.1	588.1	882.2	1176.2	1470.3	1764.4	2058.4	2352.5	2646.5
0.50	1.20	165.4	330.9	496.3	661.8	827.2	992.7	1158.1	1323.6	1489.0
0.87	1.27	274.3	548.5	822.8	1097.0	1371.3	1645.6	1919.8	2194.1	2468.4
0.59	1.47	160.9	321.7	482.6	643.5	804.3	965.2	1126.0	1286.9	1447.8
0.63	1.33	189.4	378.8	568.3	757.7	947.1	1136.5	1325.9	1515.4	1704.8
0.44	1.25	138.7	277.5	416.2	554.9	693.6	832.4	971.1	1109.8	1248.6
0.45	1.46	123.2	246.4	369.6	492.8	616.0	739.2	862.4	985.6	1108.7
0.77	0.95	323.5	647.1	970.6	1294.1	1617.7	1941.2	2264.7	2588.2	2911.8
0.53	0.83	254.1	508.3	762.4	1016.6	1270.7	1524.8	1779.0	2033.1	2287.3
0.86	0.80	423.7	847.5	1271.2	1695.0	2118.7	2542.5	2966.2	3390.0	3813.7
0.62	0.96	254.5	508.9	763.4	1017.9	1272.3	1526.8	1781.3	2035.7	2290.2
0.82	0.73	443.3	886.7	1330.0	1773.4	2216.7	2660.1	3103.4	3546.7	3990.1
0.89	1.12	314.9	629.7	944.6	1259.5	1574.4	1889.2	2204.1	2519.0	2833.8
0.58	0.75	305.7	611.4	917.1	1222.7	1528.4	1834.1	2139.8	2445.5	2751.2
0.82	1.05	310.1	620.2	930.3	1240.3	1550.4	1860.5	2170.6	2480.7	2790.8
0.41	0.73	223.5	447.1	670.6	894.2	1117.7	1341.3	1564.8	1788.3	2011.9
0.76	1.21	249.4	498.9	748.3	997.8	1247.2	1496.7	1746.1	1995.6	2245.0
0.84	1.01	331.3	662.7	994.0	1325.3	1656.6	1988.0	2319.3	2650.6	2982.0
0.42	1.25	133.7	267.3	401.0	534.7	668.4	802.0	935.7	1069.4	1203.1
0.87	0.81	428.1	856.1	1284.2	1712.2	2140.3	2568.3	2996.4	3424.4	3852.5
0.69	0.88	312.6	625.1	937.7	1250.3	1562.9	1875.4	2188.0	2500.6	2813.1
0.77	1.27	242.1	484.2	726.4	968.5	1210.6	1452.7	1694.8	1936.9	2179.1
0.43	0.86	200.0	400.1	600.1	800.1	1000.2	1200.2	1400.2	1600.3	1800.3
0.78	1.17	264.6	529.2	793.8	1058.5	1323.1	1587.7	1852.3	2116.9	2381.5
0.83	0.78	422.4	844.7	1267.1	1689.4	2111.8	2534.1	2956.5	3378.9	3801.2
0.48	0.98	195.3	390.7	586.0	781.3	976.6	1172.0	1367.3	1562.6	1757.9
0.76	1.09	277.1	554.1	831.2	1108.2	1385.3	1662.4	1939.4	2216.5	2493.6
0.57	0.89	254.5	509.0	763.5	1018.0	1272.5	1527.0	1781.5	2036.0	2290.5
0.81	1.03	312.9	625.8	938.7	1251.6	1564.5	1877.3	2190.2	2503.1	2816.0

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.67	1.09	206.2	412.5	618.7	824.9	1031.2	1237.4	1443.6	1649.9	1856.1
0.69	1.04	265.9	531.8	797.7	1063.6	1329.5	1595.4	1861.4	2127.3	2393.2
0.78	1.11	281.2	562.3	843.5	1124.6	1405.8	1686.9	1968.1	2249.2	2530.4
0.42	0.73	230.2	460.3	690.5	920.7	1150.8	1381.0	1611.2	1841.3	2071.5
0.59	0.96	247.3	494.6	741.9	989.2	1236.5	1483.8	1731.1	1978.4	2225.7
0.61	1.20	200.7	401.4	602.0	802.7	1003.4	1204.1	1404.7	1605.4	1806.1
0.86	1.11	306.4	612.9	919.3	1225.7	1532.2	1838.6	2145.0	2451.5	2757.9
0.46	0.88	207.6	415.2	622.8	830.4	1038.0	1245.6	1453.2	1660.7	1868.3
0.73	0.77	376.8	753.6	1130.4	1507.2	1884.0	2260.8	2637.6	3014.4	3391.2
0.57	1.34	168.1	336.3	504.4	672.6	840.7	1008.9	1177.0	1345.2	1513.3
0.59	0.88	268.1	536.1	804.2	1072.2	1340.3	1608.3	1876.4	2144.4	2412.5
0.71	0.99	284.5	568.9	853.4	1137.8	1422.3	1706.7	1991.2	2275.6	2560.1
0.64	1.48	171.0	342.0	513.0	684.0	855.0	1026.0	1197.0	1368.0	1539.0
0.76	1.39	217.7	435.4	653.0	870.7	1088.4	1306.1	1523.8	1741.5	1959.1
0.68	0.74	366.8	733.6	1100.5	1467.3	1834.1	2200.9	2567.8	2934.6	3301.4
0.60	0.82	292.6	585.2	877.8	1170.4	1463.0	1755.6	2048.2	2340.8	2633.4
0.81	1.25	256.8	513.5	770.3	1027.0	1283.8	1540.5	1797.3	2054.0	2310.8
0.52	1.26	165.1	330.2	495.3	660.4	825.5	990.6	1155.7	1320.7	1485.8
0.47	1.41	132.6	265.1	397.7	530.2	662.8	795.4	927.9	1060.5	1193.0
0.90	1.46	245.3	490.6	735.9	981.3	1226.6	1471.9	1717.2	1962.5	2207.8
0.42	1.21	139.0	278.0	417.0	556.0	695.1	834.1	973.1	1112.1	1251.1
0.82	0.91	358.2	716.5	1074.7	1433.0	1791.2	2149.4	2507.7	2865.9	3224.2
0.74	1.28	228.7	457.3	686.0	914.6	1143.3	1371.9	1600.6	1829.2	2057.9
0.87	1.09	317.0	634.0	951.0	1267.9	1584.9	1901.9	2218.9	2535.9	2852.9
0.47	1.30	143.0	286.0	428.9	571.9	714.9	857.9	1000.9	1143.9	1286.8
0.49	1.35	144.3	288.5	432.8	577.1	721.3	865.6	1009.9	1154.1	1298.4
0.86	0.91	376.3	752.6	1129.0	1505.3	1881.6	2257.9	2634.2	3010.6	3386.9
0.47	1.44	129.4	258.7	388.1	517.4	646.8	776.1	905.5	1034.8	1164.2
0.61	1.15	210.1	420.2	630.4	840.5	1050.6	1260.7	1470.8	1681.0	1891.1
0.64	0.82	308.6	617.2	925.9	1234.5	1543.1	1851.7	2160.3	2468.9	2777.6
0.44	0.85	205.4	410.8	616.1	821.5	1026.9	1232.3	1437.7	1643.0	1848.4
0.46	0.97	190.3	380.5	570.8	761.1	951.3	1141.6	1331.9	1522.2	1712.4
0.66	1.40	184.4	368.7	553.1	737.5	921.8	1106.2	1290.5	1474.9	1659.3
0.87	1.07	323.7	647.4	971.0	1294.7	1618.4	1942.1	2265.7	2589.4	2913.1
0.83	1.36	243.5	487.0	730.6	974.1	1217.6	1461.1	1704.6	1948.2	2191.7
0.85	1.10	308.7	617.5	926.2	1234.9	1543.6	1852.4	2161.1	2469.8	2778.5
0.51	1.04	196.0	392.0	587.9	783.9	979.9	1175.9	1371.9	1567.9	1763.8
0.41	1.33	122.9	245.7	368.6	491.4	614.3	737.1	860.0	982.8	1105.7
0.77	1.44	211.7	423.3	635.0	846.7	1058.4	1270.0	1481.7	1693.4	1905.0
0.71	0.93	303.7	607.4	911.1	1214.8	1518.5	1822.2	2125.9	2429.6	2733.3
0.55	1.40	155.9	311.7	467.6	623.5	779.3	935.2	1091.1	1246.9	1402.8
0.66	1.18	221.5	442.9	664.4	885.8	1107.3	1328.7	1550.2	1771.6	1993.1
0.80	1.42	225.2	450.3	675.5	900.6	1125.8	1351.0	1576.1	1801.3	2026.4
0.74	1.02	287.8	575.6	863.4	1151.2	1439.0	1726.9	2014.7	2302.5	2590.3
0.73	1.38	211.1	422.2	633.2	844.3	1055.4	1266.5	1477.5	1688.6	1899.7
0.79	1.19	265.0	530.0	795.0	1060.0	1324.9	1589.9	1854.9	2119.9	2384.9
0.43	1.18	144.1	288.3	432.4	576.6	720.7	864.9	1009.0	1153.2	1297.3
0.61	1.27	191.5	383.0	574.5	766.0	957.4	1148.9	1340.4	1531.9	1723.4
0.88	1.38	253.8	507.6	761.5	1015.3	1269.1	1522.9	1776.7	2030.6	2284.4
0.54	0.93	230.5	460.9	691.4	921.8	1152.3	1382.7	1613.2	1843.7	2074.1
0.58	1.46	158.4	316.8	475.2	633.5	791.9	950.3	1108.7	1267.1	1425.5
0.44	0.73	239.9	479.9	719.8	959.8	1199.7	1439.7	1679.6	1919.6	2159.5
0.60	0.84	282.2	564.5	846.7	1128.9	1411.1	1693.4	1975.6	2257.8	2540.1
0.56	0.76	287.7	575.4	863.1	1150.8	1438.4	1726.1	2013.8	2301.5	2589.2
0.78	0.95	327.5	655.0	982.6	1310.1	1637.6	1965.1	2292.7	2620.2	2947.7
0.47	1.21	155.0	310.0	465.1	620.1	775.1	930.1	1085.2	1240.2	1395.2
0.50	1.11	177.4	354.9	532.3	709.8	887.2	1064.6	1242.1	1419.5	1596.9
0.65	1.46	177.1	354.2	531.2	708.3	885.4	1062.5	1239.6	1416.6	1593.7
0.75	0.74	400.5	801.0	1201.6	1602.1	2002.6	2403.1	2803.7	3204.2	3604.7
0.78	0.82	379.7	759.4	1139.1	1518.8	1898.5	2278.2	2657.9	3037.6	3417.3
0.42	0.93	181.1	362.2	543.3	724.4	905.5	1086.6	1267.6	1448.7	1629.8
0.84	0.87	384.4	768.8	1153.1	1537.5	1921.9	2306.3	2690.6	3075.0	3459.4
0.64	0.84	303.3	606.6	909.9	1213.2	1516.5	1819.8	2123.1	2426.5	2729.8
0.61	0.95	255.6	511.3	766.9	1022.6	1278.2	1533.9	1789.5	2045.2	2300.8
0.77	1.15	267.4	534.8	802.3	1069.7	1337.1	1604.5	1871.9	2139.4	2406.8
0.84	0.85	391.8	783.7	1175.5	1567.4	1959.2	2351.0	2742.9	3134.7	3526.6
0.82	1.03	314.7	629.4	944.1	1258.8	1573.6	1888.3	2203.0	2517.7	2832.4
0.61	0.87	277.8	555.5	833.3	1111.0	1388.8	1666.5	1944.3	2222.0	2499.8
0.56	1.10	200.1	400.2	600.3	800.4	1000.5	1200.6	1400.7	1600.8	1800.9
0.51	1.29	156.5	312.9	469.4	625.9	782.3	938.8	1095.3	1251.8	1408.2
0.80	1.37	233.4	466.7	700.1	933.4	1166.8	1400.2	1633.5	1866.9	2100.2
0.62	0.99	248.3	496.7	745.0	993.4	1241.7	1490.1	1738.4	1986.8	2235.1
0.85	0.86	394.6	789.3	1183.9	1578.6	1973.2	2367.9	2762.5	3157.2	3551.8
0.49	0.85	228.9	457.9	686.8	915.7	1144.6	1373.6	1602.5	1831.4	2060.3
0.72	0.74	386.9	773.8	1160.7	1547.6	1934.5	2321.4	2708.3	3095.2	3482.1
0.80	1.00	316.9	633.7	950.6	1267.5	1584.3	1901.2	2218.1	2535.0	2851.8
0.77	1.30	235.4	470.9	706.3	941.7	1177.2	1412.6	1648.0	1883.4	2118.9
0.42	1.31	129.0	258.0	387.0	515.9	644.9	773.9	902.9	1031.9	1160.9
0.50	0.95	211.0	422.0	633.0	844.0	1054.9	1265.9	1476.9	1687.9	1898.9
0.67	1.15	232.2	464.5	696.7	929.0	1161.2	1393.5	1625.7	1858.0	2090.2
0.65	1.31	196.7	393.4	590.1	786.8	983.5	1180.3	1377.0	1573.7	1770.4
0.44	1.36	130.3	260.6	390.9	521.2	651.5	781.8	912.1	1042.4	1172.7
0.62	1.18	209.4	418.9	628.3	837.8	1047.2	1256.6	1466.1	1675.5	1885.0
0.90	0.78	460.0	920.0	1380.0	1840.0	2299.9	2759.9	3219.9	3679.9	4139.9
0.45	1.27	141.9	283.7	425.6	567.5	709.3	851.2	993.1	1134.9	1276.8
0.47	0.90	207.3	414.6	621.8	829.1	1036.4	1243.7	1450.9	1658.2	1865.5
0.57	1.32	172.3	344.5	516.8	689.0	861.3	1033.6	1205.8	1378.1	1550.3
0.43	0.91	186.7	373.4	560.2	746.9	933.6	1120.3	1307.1	1493.8	1680.5
0.73	1.14	255.0	510.1	765.1	1020.1	1275.1	1530.2	1785.2	2040.2	2295.2

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of .90% Number of Fibers per cc
0.46	0.94	188.3	376.6	564.9	753.2	941.6	1129.9	1318.2	1506.5	1694.8
0.49	0.87	226.9	451.7	677.6	903.4	1129.3	1356.1	1581.0	1806.8	2032.7
0.76	0.95	317.6	635.2	952.8	1270.4	1588.0	1906.6	2223.2	2540.8	2858.4
0.59	0.82	286.1	572.2	858.3	1144.4	1430.6	1716.7	2002.8	2288.9	2575.0
0.49	1.48	132.2	264.4	396.7	528.9	661.1	793.3	925.5	1057.8	1190.0
0.48	1.18	160.8	321.5	482.3	643.1	803.9	964.6	1125.4	1286.2	1446.9
0.46	1.02	179.3	358.7	538.0	717.4	896.7	1076.1	1255.4	1434.8	1614.1
0.45	1.21	146.8	293.5	440.3	587.0	733.8	880.5	1027.3	1174.0	1320.8
0.68	1.14	238.0	475.9	713.9	951.8	1189.8	1427.7	1665.7	1903.7	2141.6
0.59	1.22	190.2	380.4	570.6	760.7	950.9	1141.1	1331.3	1521.5	1711.7
0.77	0.96	321.3	642.6	963.9	1285.2	1606.5	1927.8	2249.1	2570.4	2891.7
0.61	1.04	232.8	465.5	698.3	931.0	1163.8	1396.5	1629.3	1862.1	2094.8
0.87	0.82	423.7	847.4	1271.1	1694.8	2118.5	2542.2	2965.9	3389.6	3813.3
0.63	1.02	246.9	493.8	740.6	987.5	1234.4	1481.3	1728.2	1975.0	2221.9
0.79	0.87	361.1	722.2	1083.3	1444.4	1805.5	2166.6	2527.7	2888.8	3249.9
0.41	1.47	111.4	222.7	334.1	445.4	556.8	668.1	779.5	890.8	1002.2
0.85	0.76	446.9	893.8	1340.7	1787.6	2234.5	2681.4	3128.3	3575.2	4022.2
0.63	1.07	235.7	471.4	707.1	942.8	1178.5	1414.2	1649.9	1885.6	2121.3
0.69	0.91	298.6	597.3	895.9	1194.6	1493.2	1791.9	2090.5	2389.2	2687.8
0.47	0.70	268.4	536.8	805.2	1073.6	1342.0	1610.4	1878.9	2147.3	2415.7
0.65	1.25	208.0	416.0	623.9	831.9	1039.9	1247.9	1455.9	1663.9	1871.8
0.57	0.99	229.8	459.5	689.3	919.1	1148.8	1378.6	1608.4	1838.2	2067.9
0.43	1.06	161.8	323.7	485.5	647.3	809.2	971.0	1132.8	1294.6	1456.5
0.78	1.03	302.1	604.1	906.2	1208.2	1510.3	1812.3	2114.4	2416.4	2718.5
0.84	1.18	285.5	571.1	856.6	1142.1	1427.6	1713.2	1998.7	2284.2	2569.8
0.41	0.87	187.0	374.0	561.1	748.1	935.1	1122.1	1309.1	1496.1	1683.2
0.42	0.86	194.1	388.1	582.2	776.2	970.3	1164.4	1358.4	1552.5	1746.5
0.66	0.88	296.3	592.5	888.8	1185.1	1481.4	1777.6	2073.9	2370.2	2666.4
0.70	0.75	366.9	733.8	1100.7	1467.5	1834.4	2201.3	2568.2	2935.1	3302.0
0.88	1.14	306.9	613.7	920.6	1227.5	1534.3	1841.2	2148.1	2454.9	2761.8
0.54	0.96	222.8	445.6	668.4	891.3	1114.1	1336.9	1559.7	1782.5	2005.3
0.86	0.83	416.8	833.7	1250.5	1667.3	2084.1	2501.0	2917.8	3334.6	3751.5
0.42	0.86	194.8	389.6	584.4	779.2	974.0	1168.8	1363.6	1558.3	1753.1
0.59	1.50	157.2	314.4	471.6	628.8	785.9	943.1	1100.3	1257.5	1414.7
0.51	1.37	148.3	296.6	444.9	593.2	741.5	889.7	1038.0	1186.3	1334.6
0.87	0.79	437.5	875.1	1312.6	1750.1	2187.7	2625.2	3062.7	3500.3	3937.8
0.46	1.40	129.3	258.6	387.9	517.2	646.5	775.8	905.1	1034.5	1163.8
0.46	1.01	181.3	362.5	543.8	725.0	906.3	1087.5	1268.8	1450.0	1631.3
	Averages:	249	499	748	998	1247	1497	1746	1996	2245

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 35' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
35*25*8	Dimensions of Room (Ft)	198240000	Room Volume in Cubic Centimeters
7000	Cubic Footage of Room	691840	Wall Area in Room in Square Centimeters
960	Wall Area of Room (Sq Ft)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	9.6	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft of wall)	5.76	Gallons of ACJC Applied to Walls
		21801.6	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume within ACJC, Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90% Number of Fibers per cc
0.40	0.79	173.2	346.3	519.5	692.6	865.8	1038.9	1212.1	1385.2	1558.4
0.58	1.23	160.5	320.9	481.4	641.8	802.3	962.7	1123.2	1283.6	1444.1
0.63	0.88	243.4	486.8	730.2	973.6	1217.0	1460.4	1703.8	1947.2	2190.6
0.62	1.36	157.1	314.1	471.2	628.3	785.3	942.4	1099.4	1256.5	1413.6
0.83	0.74	382.9	765.9	1148.8	1531.8	1914.7	2297.7	2680.6	3063.6	3446.5
0.48	0.86	189.4	378.8	568.1	757.5	946.9	1136.3	1325.6	1515.0	1704.4
0.43	0.76	193.0	385.9	578.9	771.8	964.8	1157.7	1350.7	1543.6	1736.6
0.61	1.10	187.7	375.4	563.1	750.8	938.5	1126.2	1313.9	1501.6	1689.3
0.64	1.17	185.7	371.4	557.1	742.8	928.5	1114.2	1299.9	1485.6	1671.3
0.61	0.80	263.0	525.9	788.9	1051.8	1314.8	1577.8	1840.7	2103.7	2366.7
0.90	1.35	227.3	454.6	681.9	909.2	1136.4	1363.7	1591.0	1818.3	2045.6
0.86	0.99	295.8	591.5	887.3	1183.0	1478.8	1774.5	2070.3	2366.1	2661.8
0.43	1.43	102.6	205.3	307.9	410.6	513.2	615.9	718.5	821.2	923.8
0.50	0.74	233.0	465.9	698.9	931.8	1164.8	1397.7	1630.7	1863.6	2096.6
0.76	1.22	212.6	425.2	637.8	850.4	1063.0	1275.6	1488.2	1700.8	1913.4
0.73	0.84	293.4	586.7	880.1	1173.4	1466.8	1760.1	2053.5	2346.8	2640.2
0.40	0.72	191.8	383.7	575.5	767.3	959.1	1151.0	1342.8	1534.6	1726.4
0.55	0.96	194.0	388.1	582.1	776.2	970.2	1164.3	1358.3	1552.4	1746.4
0.56	1.[illegible]	137.4	274.8	412.2	549.7	687.1	824.5	961.9	1099.3	1236.7
0.48	1.18	151.7	303.4	455.1	606.8	758.5	910.2	1061.9	1213.6	1365.3
0.69	1.21	193.9	387.8	581.7	775.5	969.4	1163.3	1357.2	1551.1	1745.0
0.84	1.16	245.0	489.9	734.9	979.8	1224.8	1469.8	1714.7	1959.7	2204.6
0.89	1.46	209.2	418.5	627.7	836.9	1046.1	1255.4	1464.6	1673.8	1883.0
0.58	1.07	183.3	366.7	550.0	733.3	916.7	1100.0	1283.4	1466.7	1650.0
0.59	1.42	142.9	285.7	428.6	571.4	714.3	857.2	1000.0	1142.9	1285.8
0.67	1.14	200.4	400.8	601.2	801.6	1002.0	1202.4	1402.8	1603.2	1803.7
0.85	1.11	260.4	520.9	781.3	1041.8	1302.2	1562.7	1823.1	2083.5	2344.0
0.49	0.78	215.5	431.0	646.6	862.1	1077.6	1293.1	1508.6	1724.2	1939.7
0.65	1.37	161.7	323.4	485.0	646.7	808.4	970.1	1131.8	1293.4	1455.1
0.83	1.49	190.9	381.8	572.6	763.5	954.4	1145.3	1336.2	1527.0	1717.9
0.77	1.01	259.9	519.9	779.8	1039.8	1299.7	1559.7	1819.6	2079.6	2339.5
0.81	0.83	331.2	662.5	993.7	1324.9	1656.1	1987.4	2318.6	2649.8	2981.0
0.42	1.25	113.3	226.6	339.9	453.2	566.5	679.8	793.1	906.4	1019.7
0.88	1.24	242.5	485.0	727.5	970.1	1212.6	1455.1	1697.6	1940.1	2182.6
0.48	0.80	203.3	406.5	609.8	813.1	1016.3	1219.6	1422.9	1626.1	1829.4
0.42	1.37	103.5	207.0	310.5	413.9	517.4	620.9	724.4	827.9	931.4
0.52	0.74	238.3	476.6	714.9	953.1	1191.4	1429.7	1668.0	1906.3	2144.6
0.44	0.91	166.5	333.0	499.5	666.0	832.5	998.9	1165.4	1331.9	1498.4
0.88	0.80	377.5	755.0	1132.5	1510.0	1887.5	2265.1	2642.6	3020.1	3397.6
0.42	1.06	136.0	272.0	408.1	544.1	680.1	816.1	952.1	1088.2	1224.2
0.84	1.43	201.4	402.7	604.1	805.4	1006.8	1208.1	1409.5	1610.8	1812.2
0.84	0.77	373.3	746.5	1119.8	1493.1	1866.4	2239.6	2612.9	2986.2	3359.4
0.72	1.30	189.2	378.5	567.7	757.0	946.2	1135.5	1324.7	1514.0	1703.2
0.77	0.80	329.2	658.4	987.6	1316.8	1646.1	1975.3	2304.5	2633.7	2962.9
0.88	1.20	252.1	504.1	756.2	1008.2	1260.3	1512.3	1764.4	2016.4	2268.5
0.50	1.20	141.8	283.6	425.4	567.2	709.0	850.9	992.7	1134.5	1276.3
0.87	1.27	235.1	470.2	705.2	940.3	1175.4	1410.5	1645.6	1880.7	2115.7
0.59	1.47	137.9	275.8	413.6	551.5	689.4	827.3	965.2	1103.1	1240.9
0.63	1.33	162.4	324.7	487.1	649.4	811.8	974.2	1136.5	1298.9	1461.2
0.44	1.25	118.9	237.8	356.7	475.6	594.5	713.5	832.4	951.3	1070.2
0.45	1.46	105.6	211.2	316.8	422.4	528.0	633.6	739.2	844.8	950.4
0.77	0.95	277.3	554.6	831.9	1109.2	1386.6	1663.9	1941.2	2218.5	2495.8
0.53	0.83	217.8	435.7	653.5	871.3	1089.2	1307.0	1524.8	1742.7	1960.5
0.86	0.80	363.2	726.4	1089.6	1452.9	1816.1	2179.3	2542.5	2905.7	3268.9
0.62	0.96	218.1	436.2	654.3	872.5	1090.6	1308.7	1526.8	1744.9	1963.0
0.82	0.73	380.0	760.0	1140.0	1520.0	1900.0	2280.0	2660.1	3040.1	3420.1
0.89	1.12	269.9	539.8	809.7	1079.6	1349.4	1619.3	1889.2	2159.1	2429.0
0.58	0.75	262.0	524.0	786.0	1048.1	1310.1	1572.1	1834.1	2096.1	2358.1
0.82	1.05	265.8	531.6	797.4	1063.2	1328.9	1594.7	1860.5	2126.3	2392.1
0.41	0.73	191.6	383.2	574.8	766.4	958.0	1149.6	1341.3	1532.9	1724.5
0.76	1.21	213.8	427.6	641.4	855.2	1069.1	1282.9	1496.7	1710.5	1924.3
0.84	1.01	284.0	568.0	852.0	1136.0	1420.0	1704.0	1988.0	2272.0	2556.0
0.42	1.25	114.6	229.2	343.7	458.3	572.9	687.5	802.0	916.6	1031.2
0.87	0.81	366.9	733.8	1100.7	1467.6	1834.5	2201.4	2568.3	2935.2	3302.1
0.69	0.88	267.9	535.8	803.8	1071.7	1339.6	1607.5	1875.4	2143.3	2411.3
0.77	1.27	207.5	415.1	622.6	830.1	1037.6	1245.2	1452.7	1660.2	1867.8
0.43	0.86	171.5	342.9	514.4	685.8	857.3	1028.7	1200.2	1371.6	1543.1
0.78	1.17	226.8	453.6	680.4	907.2	1134.1	1360.9	1587.7	1814.5	2041.3
0.83	0.78	362.0	724.0	1086.1	1448.1	1810.1	2172.1	2534.1	2896.2	3258.2
0.48	0.98	167.4	334.8	502.3	669.7	837.1	1004.5	1172.0	1339.4	1506.8
0.76	1.09	237.5	475.0	712.4	949.9	1187.4	1424.9	1662.4	1899.9	2137.3
0.57	0.89	218.1	436.3	654.4	872.6	1090.7	1308.9	1527.0	1745.1	1963.3
0.81	1.03	268.2	536.4	804.6	1072.8	1341.0	1609.2	1877.3	2145.5	2413.7

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of 50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.57	1.09	176.8	353.5	530.3	707.1	883.9	1060.6	1237.4	1414.2	1590.9
0.69	1.04	227.9	455.8	683.8	911.7	1139.6	1367.5	1595.4	1823.4	2051.3
0.78	1.11	241.0	482.0	723.0	964.0	1204.9	1445.9	1686.9	1927.9	2168.9
0.42	0.73	197.3	394.6	591.9	789.1	986.4	1183.7	1381.0	1578.3	1775.6
0.59	0.95	212.0	423.9	635.9	847.9	1059.9	1271.8	1483.8	1695.8	1907.8
0.61	1.20	172.0	344.0	516.0	688.0	860.0	1032.0	1204.1	1376.1	1548.1
0.86	1.11	262.7	525.3	788.0	1050.6	1313.3	1575.9	1838.6	2101.3	2363.9
0.46	0.88	177.9	355.9	533.8	711.7	889.7	1067.6	1245.6	1423.5	1601.4
0.73	0.77	323.0	645.9	968.9	1291.9	1614.9	1937.8	2260.8	2583.8	2906.8
0.57	1.34	144.1	288.3	432.4	576.5	720.6	864.8	1008.9	1153.0	1297.1
0.59	0.88	229.8	459.5	689.3	919.0	1148.8	1378.6	1608.3	1838.1	2067.8
0.71	0.99	243.8	487.6	731.5	975.3	1219.1	1462.9	1706.7	1950.5	2194.4
0.64	1.48	146.6	293.1	439.7	586.3	732.8	879.4	1026.0	1172.6	1319.1
0.76	1.39	186.6	373.2	559.8	746.3	932.9	1119.5	1306.1	1492.7	1679.3
0.68	0.74	314.4	628.8	943.3	1257.7	1572.1	1886.5	2200.9	2515.4	2829.8
0.60	0.82	250.8	501.6	752.4	1003.2	1254.0	1504.8	1756.6	2006.4	2257.2
0.81	1.25	220.1	440.1	660.2	880.3	1100.4	1320.4	1540.5	1760.6	1980.7
0.52	1.26	141.5	283.0	424.5	566.0	707.5	849.1	990.6	1132.1	1273.6
0.47	1.41	113.6	227.2	340.9	454.5	568.1	681.7	795.4	909.0	1022.6
0.90	1.46	210.3	420.5	630.8	841.1	1051.3	1261.6	1471.9	1682.2	1892.4
0.42	1.21	119.2	238.3	357.5	476.6	595.8	714.9	834.1	953.2	1072.4
0.82	0.91	307.1	614.1	921.2	1228.2	1535.3	1842.4	2149.4	2456.5	2763.6
0.74	1.28	196.0	392.0	588.0	784.0	979.9	1175.9	1371.9	1567.9	1763.9
0.87	1.09	271.7	543.4	815.1	1086.8	1358.5	1630.2	1901.9	2173.6	2445.3
0.47	1.30	122.6	245.1	367.7	490.2	612.8	735.3	857.9	980.5	1103.0
0.49	1.35	123.7	247.3	371.0	494.6	618.3	741.9	865.6	989.2	1112.9
0.86	0.91	322.6	645.1	967.7	1290.2	1612.8	1935.4	2257.9	2580.5	2903.0
0.47	1.44	110.9	221.8	332.6	443.5	554.4	665.3	776.1	887.0	997.9
0.61	1.15	180.1	360.2	540.3	720.4	900.5	1080.6	1260.7	1440.8	1620.9
0.64	0.82	264.5	529.1	793.6	1058.1	1322.6	1587.2	1851.7	2116.2	2380.8
0.44	0.85	176.0	352.1	528.1	704.2	880.2	1056.2	1232.3	1408.3	1584.4
0.46	0.97	163.1	326.2	489.3	652.4	815.4	978.5	1141.6	1304.7	1467.8
0.65	1.40	158.0	316.1	474.1	632.1	790.1	948.2	1106.2	1264.2	1422.2
0.87	1.07	277.4	554.9	832.3	1109.8	1387.2	1664.6	1942.1	2219.5	2496.9
0.83	1.36	208.7	417.5	626.2	834.9	1043.7	1252.4	1461.1	1669.9	1878.6
0.85	1.10	264.6	529.2	793.9	1058.5	1323.1	1587.7	1852.4	2117.0	2381.6
0.51	1.04	168.0	336.0	504.0	671.9	839.9	1007.9	1175.9	1343.9	1511.9
0.41	1.33	105.3	210.6	315.9	421.2	526.5	631.8	737.1	842.4	947.7
0.77	1.44	181.4	362.9	544.3	725.7	907.2	1088.6	1270.0	1451.5	1632.9
0.71	0.93	260.3	520.6	780.9	1041.3	1301.6	1561.9	1822.2	2082.5	2342.8
0.55	1.40	133.6	267.2	400.8	534.4	668.0	801.6	935.2	1068.8	1202.4
0.66	1.18	189.8	379.6	569.5	759.3	949.1	1138.9	1328.7	1518.5	1708.4
0.80	1.42	193.0	386.0	579.0	772.0	965.0	1158.0	1351.0	1544.0	1737.0
0.74	1.02	246.7	493.4	740.1	986.8	1233.5	1480.2	1726.9	1973.5	2220.2
0.73	1.38	180.9	361.8	542.8	723.7	904.6	1085.5	1266.5	1447.4	1628.3
0.79	1.19	227.1	454.3	681.4	908.5	1135.7	1362.8	1589.9	1817.1	2044.2
0.43	1.18	123.6	247.1	370.7	494.2	617.8	741.3	864.9	988.4	1112.0
0.61	1.27	164.1	328.3	492.4	656.5	820.7	984.8	1148.9	1313.1	1477.2
0.88	1.38	217.6	435.1	652.7	870.2	1087.8	1305.4	1522.9	1740.5	1958.0
0.54	0.93	197.5	395.1	592.6	790.1	987.7	1185.2	1382.7	1580.3	1777.8
0.58	1.46	135.8	271.5	407.3	543.0	678.8	814.6	950.3	1086.1	1221.8
0.44	0.73	205.7	411.3	617.0	822.7	1028.3	1234.0	1439.7	1645.3	1851.0
0.60	0.84	241.9	483.8	725.7	967.6	1209.5	1451.5	1693.4	1935.3	2177.2
0.55	0.76	246.6	493.2	739.8	986.4	1232.9	1479.5	1726.1	1972.7	2219.3
0.78	0.95	280.7	561.5	842.2	1122.9	1403.7	1684.4	1965.1	2245.9	2526.6
0.47	1.21	132.9	265.8	398.6	531.5	664.4	797.3	930.1	1063.0	1195.9
0.50	1.11	152.1	304.2	456.3	608.4	760.5	912.5	1064.6	1216.7	1368.8
0.65	1.46	151.8	303.6	455.4	607.1	758.9	910.7	1062.5	1214.3	1366.1
0.75	0.74	343.3	686.6	1029.9	1373.2	1716.5	2059.8	2403.1	2746.4	3089.7
0.78	0.82	325.5	650.9	976.4	1301.8	1627.3	1952.8	2278.2	2603.7	2929.1
0.42	0.93	155.2	310.4	465.7	620.9	776.1	931.3	1086.6	1241.8	1397.0
0.84	0.87	329.5	658.9	988.4	1317.9	1647.3	1976.8	2306.3	2635.7	2965.2
0.64	0.84	260.0	520.0	779.9	1039.9	1299.9	1559.9	1819.8	2079.8	2339.8
0.61	0.95	219.1	438.3	657.4	876.5	1095.6	1314.8	1533.9	1753.0	1972.1
0.77	1.15	229.2	458.4	687.6	916.9	1146.1	1375.3	1604.5	1833.7	2062.9
0.84	0.85	335.9	671.7	1007.6	1343.5	1679.3	2015.2	2351.0	2686.9	3022.8
0.82	1.03	269.8	539.5	809.3	1079.0	1348.8	1618.5	1888.3	2158.0	2427.8
0.61	0.87	238.1	476.2	714.2	952.3	1190.4	1428.5	1666.5	1904.6	2142.7
0.56	1.10	171.5	343.0	514.6	686.1	857.6	1029.1	1200.6	1372.1	1543.7
0.51	1.29	134.1	268.2	402.3	536.5	670.6	804.7	938.8	1072.9	1207.0
0.80	1.37	200.0	400.0	600.1	800.1	1000.1	1200.1	1400.2	1600.2	1800.2
0.62	0.99	212.9	425.7	638.6	851.5	1064.3	1277.2	1490.1	1702.9	1915.8
0.85	0.86	338.3	676.5	1014.8	1353.1	1691.3	2029.6	2367.9	2706.1	3044.4
0.49	0.85	196.2	392.4	588.7	784.9	981.1	1177.3	1373.6	1569.8	1766.0
0.72	0.74	331.6	663.2	994.9	1326.5	1658.1	1989.7	2321.4	2653.0	2984.6
0.80	1.00	271.6	543.2	814.8	1086.4	1358.0	1629.6	1901.2	2172.8	2444.4
0.77	1.30	201.8	403.6	605.4	807.2	1009.0	1210.8	1412.6	1614.4	1816.2
0.42	1.31	110.6	221.1	331.7	442.2	552.8	663.4	773.9	884.5	995.0
0.50	0.95	180.8	361.7	542.5	723.4	904.2	1085.1	1265.9	1446.8	1627.6
0.67	1.15	199.1	398.1	597.2	796.3	995.4	1194.4	1393.5	1592.6	1791.6
0.65	1.31	168.6	337.2	505.8	674.4	843.0	1011.6	1180.3	1348.9	1517.5
0.44	1.36	111.7	223.4	335.0	446.7	558.4	670.1	781.8	893.4	1005.1
0.62	1.18	179.5	359.0	538.6	718.1	897.6	1077.1	1256.6	1436.2	1615.7
0.90	0.78	394.3	788.6	1182.8	1577.1	1971.4	2365.7	2759.9	3154.2	3548.5
0.45	1.27	121.6	243.2	364.8	486.4	608.0	729.6	851.2	972.8	1094.4
0.47	0.90	177.7	355.3	533.0	710.7	888.3	1066.0	1243.7	1421.3	1599.0
0.57	1.32	147.7	295.3	443.0	590.6	738.3	885.9	1033.6	1181.2	1328.9
0.43	0.91	160.0	320.1	480.1	640.2	800.2	960.3	1120.3	1280.4	1440.4
0.73	1.14	218.6	437.2	655.8	874.4	1093.0	1311.6	1530.2	1748.8	1967.4

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of .90% Number of Fibers per cc
0.45	0.94	161.4	322.8	484.2	645.6	807.0	968.5	1129.9	1291.3	1452.7
0.49	0.87	193.6	387.2	580.8	774.4	968.0	1161.5	1355.1	1548.7	1742.3
0.76	0.95	272.2	544.5	816.7	1088.9	1361.2	1633.4	1905.6	2177.9	2450.1
0.59	0.82	245.2	490.5	735.7	981.0	1226.2	1471.4	1716.7	1961.9	2207.1
0.49	1.48	113.3	226.7	340.0	453.3	566.7	680.0	793.3	906.7	1020.0
0.48	1.18	137.8	275.6	413.4	551.2	689.0	826.8	964.6	1102.4	1240.2
0.46	1.02	153.7	307.4	461.2	614.9	768.6	922.3	1076.1	1229.8	1383.5
0.45	1.21	125.8	251.6	377.4	503.2	628.9	754.7	880.5	1006.3	1132.1
0.68	1.14	204.0	407.9	611.9	815.9	1019.8	1223.8	1427.7	1631.7	1835.7
0.59	1.22	163.0	326.0	489.0	652.1	815.1	978.1	1141.1	1304.1	1467.1
0.77	0.96	275.4	550.8	826.2	1101.6	1377.0	1652.4	1927.8	2203.2	2478.6
0.61	1.04	199.5	399.0	598.5	798.0	997.5	1197.0	1396.5	1596.0	1795.6
0.87	0.82	363.2	726.3	1089.5	1452.7	1815.9	2179.0	2542.2	2905.4	3268.6
0.63	1.02	211.6	423.2	634.8	846.4	1058.1	1269.7	1481.3	1692.9	1904.5
0.79	0.87	309.5	619.0	928.5	1238.0	1547.6	1857.1	2166.6	2476.1	2785.6
0.41	1.47	95.4	190.9	286.3	381.8	477.2	572.7	668.1	763.6	859.0
0.85	0.76	383.1	766.1	1149.2	1532.2	1915.3	2298.4	2681.4	3064.5	3447.6
0.63	1.07	202.0	404.0	606.1	808.1	1010.1	1212.1	1414.2	1616.2	1818.2
0.69	0.91	256.0	512.0	768.0	1023.9	1279.9	1535.9	1791.9	2047.9	2303.9
0.47	0.70	230.1	460.1	690.2	920.3	1150.3	1380.4	1610.4	1840.5	2070.6
0.65	1.25	178.3	356.5	534.8	713.1	891.4	1069.6	1247.9	1426.2	1604.4
0.57	0.99	196.9	393.9	590.8	787.8	984.7	1181.7	1378.6	1575.6	1772.5
0.43	1.06	138.7	277.4	416.1	554.8	693.6	832.3	971.0	1109.7	1248.4
0.78	1.03	258.9	517.8	776.7	1035.6	1294.5	1553.4	1812.3	2071.2	2330.1
0.84	1.18	244.7	489.5	734.2	979.0	1223.7	1468.4	1713.2	1957.9	2202.7
0.41	0.87	160.3	320.6	480.9	641.2	801.5	961.8	1122.1	1282.4	1442.7
0.42	0.86	166.3	332.7	499.0	665.3	831.7	998.0	1164.4	1330.7	1497.0
0.66	0.88	253.9	507.9	761.8	1015.8	1269.7	1523.7	1777.6	2031.6	2285.5
0.70	0.75	314.5	628.9	943.4	1257.9	1572.4	1886.8	2201.3	2515.8	2830.2
0.88	1.14	263.0	526.1	789.1	1052.1	1315.2	1578.2	1841.2	2104.2	2367.3
0.54	0.96	191.0	382.0	573.0	763.9	954.9	1145.9	1336.9	1527.9	1718.9
0.86	0.83	357.3	714.6	1071.8	1429.1	1786.4	2143.7	2501.0	2858.3	3215.5
0.42	0.86	167.0	333.9	500.9	667.9	834.8	1001.8	1168.8	1335.7	1502.7
0.59	1.50	134.7	269.5	404.2	538.9	673.7	808.4	943.1	1077.9	1212.6
0.51	1.37	127.1	254.2	381.3	508.4	635.5	762.6	889.7	1016.9	1144.0
0.87	0.79	375.0	750.1	1125.1	1500.1	1875.1	2250.2	2625.2	3000.2	3375.2
0.46	1.40	110.8	221.7	332.5	443.3	554.2	665.0	775.8	886.7	997.5
0.46	1.01	155.4	310.7	466.1	621.4	776.8	932.2	1087.5	1242.9	1398.2
	Averages:	214	428	642	855	1069	1283	1497	1711	1925

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 40' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
40*25*8	Dimensions of Room (Ft)	226660000	Room Volume in Cubic Centimeters
8000	Cubic Footage of Room	966160	Wall Area in Room in Square Centimeters
1040	Wall Area of Room (Sq Ft)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	10.4	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft of wall)	6.24	Gallons of ACJC Applied to Walls
		23618.4	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume within ACJC, Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of 90%, Number of Fibers per cc
0.40	0.79	151.5	303.0	454.5	606.0	757.5	909.1	1060.6	1212.1	1363.6
0.58	1.23	140.4	280.8	421.2	561.6	702.0	842.4	982.8	1123.2	1263.6
0.63	0.88	213.0	426.0	638.9	851.9	1064.9	1277.9	1490.8	1703.8	1916.8
0.62	1.36	137.4	274.9	412.3	549.7	687.2	824.6	962.0	1099.4	1236.9
0.83	0.74	335.1	670.2	1005.2	1340.3	1675.4	2010.5	2345.5	2680.6	3015.7
0.48	0.86	165.7	331.4	497.1	662.8	828.5	994.2	1159.9	1325.6	1491.3
0.43	0.76	168.8	337.7	506.5	675.3	844.2	1013.0	1181.8	1350.7	1519.5
0.61	1.10	164.2	328.5	492.7	656.9	821.2	985.4	1149.7	1313.9	1478.1
0.64	1.17	162.5	325.0	487.5	649.9	812.4	974.9	1137.4	1299.9	1462.4
0.61	0.80	230.1	460.2	690.3	920.4	1150.5	1380.6	1610.6	1840.7	2070.8
0.90	1.35	198.9	397.8	596.6	795.5	994.4	1193.3	1392.1	1591.0	1789.9
0.86	0.99	258.8	517.6	776.4	1035.1	1293.9	1552.7	1811.5	2070.3	2329.1
0.43	1.43	89.8	179.6	269.5	359.3	449.1	538.9	628.7	718.5	808.4
0.50	0.74	203.8	407.7	611.5	815.3	1019.2	1223.0	1426.8	1630.7	1834.5
0.76	1.22	186.0	372.1	558.1	744.1	930.1	1116.2	1302.2	1488.2	1674.3
0.73	0.84	256.7	513.4	770.0	1026.7	1283.4	1540.1	1796.8	2053.5	2310.1
0.40	0.72	167.8	335.7	503.5	671.4	839.2	1007.1	1174.9	1342.8	1510.6
0.55	0.96	169.8	339.6	509.4	679.2	849.0	1018.8	1188.5	1358.3	1528.1
0.56	1.40	120.2	240.5	360.7	481.0	601.2	721.4	841.7	961.9	1082.2
0.48	1.08	132.7	265.5	398.2	530.9	663.7	796.4	929.2	1061.9	1194.6
0.69	1.21	169.7	339.3	509.0	678.6	848.3	1017.9	1187.6	1357.2	1526.9
0.84	1.16	214.3	428.7	643.0	857.4	1071.7	1286.0	1500.4	1714.7	1929.1
0.89	1.46	183.1	366.1	549.2	732.3	915.4	1098.4	1281.5	1464.6	1647.7
0.58	1.07	160.4	320.8	481.3	641.7	802.1	962.5	1122.9	1283.4	1443.8
0.59	1.42	125.0	250.0	375.0	500.0	625.0	750.0	875.0	1000.0	1125.0
0.67	1.14	175.4	350.7	526.1	701.4	876.8	1052.1	1227.5	1402.8	1578.2
0.85	1.11	227.9	455.8	683.7	911.5	1139.4	1367.3	1595.2	1823.1	2051.0
0.49	0.78	188.6	377.2	565.7	754.3	942.9	1131.5	1320.1	1508.6	1697.2
0.65	1.37	141.5	282.9	424.4	565.9	707.4	848.8	990.3	1131.8	1273.2
0.83	1.49	167.0	334.0	501.1	668.1	835.1	1002.1	1169.1	1336.2	1503.2
0.77	1.01	227.5	454.9	682.4	909.8	1137.3	1364.7	1592.2	1819.6	2047.1
0.81	0.83	289.8	579.6	869.5	1159.3	1449.1	1738.9	2028.8	2318.6	2608.4
0.42	1.25	99.1	198.3	297.4	396.6	495.7	594.8	694.0	793.1	892.2
0.88	1.24	212.2	424.4	636.6	848.8	1061.0	1273.2	1485.4	1697.6	1909.8
0.48	0.80	177.9	355.7	533.6	711.4	889.3	1067.1	1245.0	1422.9	1600.7
0.42	1.37	90.5	181.1	271.6	362.2	452.7	543.3	633.8	724.4	814.9
0.52	0.74	208.5	417.0	625.5	834.0	1042.5	1251.0	1459.5	1668.0	1876.5
0.44	0.91	145.7	291.4	437.0	582.7	728.4	874.1	1019.8	1165.4	1311.1
0.88	0.80	330.3	660.6	991.0	1321.3	1651.6	1981.9	2312.2	2642.6	2972.9
0.42	1.06	119.0	238.0	357.0	476.1	595.1	714.1	833.1	952.1	1071.1
0.84	1.43	176.2	352.4	528.6	704.7	880.9	1057.1	1233.3	1409.5	1585.7
0.84	0.77	326.6	653.2	979.8	1306.4	1633.1	1959.7	2286.3	2612.9	2939.5
0.72	1.30	165.6	331.2	496.8	662.4	827.9	993.5	1159.1	1324.7	1490.3
0.77	0.80	288.1	576.1	864.2	1152.2	1440.3	1728.4	2016.4	2304.5	2592.5
0.88	1.20	220.5	441.1	661.6	882.2	1102.7	1323.3	1543.8	1764.4	1984.9
0.50	1.20	124.1	248.2	372.3	496.3	620.4	744.5	868.6	992.7	1116.8
0.87	1.27	205.7	411.4	617.1	822.8	1028.5	1234.2	1439.9	1645.6	1851.3
0.59	1.47	120.6	241.3	361.9	482.6	603.2	723.9	844.5	965.2	1085.8
0.63	1.33	142.1	284.1	426.2	568.3	710.3	852.4	994.5	1136.5	1278.6
0.44	1.25	104.0	208.1	312.1	416.2	520.2	624.3	728.3	832.4	936.4
0.45	1.46	92.4	184.8	277.2	369.6	462.0	554.4	646.8	739.2	831.6
0.77	0.95	242.6	485.3	727.9	970.6	1213.2	1455.9	1698.5	1941.2	2183.8
0.53	0.83	190.6	381.2	571.8	762.4	953.0	1143.6	1334.2	1524.8	1715.4
0.86	0.80	317.8	635.6	953.4	1271.2	1589.1	1906.9	2224.7	2542.5	2860.3
0.62	0.96	190.8	381.7	572.5	763.4	954.2	1145.1	1335.9	1526.8	1717.6
0.82	0.73	332.5	665.0	997.5	1330.0	1662.5	1995.0	2327.5	2660.1	2992.6
0.89	1.12	236.2	472.3	708.5	944.6	1180.8	1416.9	1653.1	1889.2	2125.4
0.58	0.75	229.3	458.5	687.8	917.1	1146.3	1375.6	1604.9	1834.1	2063.4
0.82	1.05	232.6	465.1	697.7	930.3	1162.8	1395.4	1628.0	1860.5	2093.1
0.41	0.73	167.7	335.3	503.0	670.6	838.3	1005.9	1173.6	1341.3	1508.9
0.76	1.21	187.1	374.2	561.3	748.3	935.4	1122.5	1309.6	1496.7	1683.8
0.84	1.01	248.5	497.0	745.5	994.0	1242.5	1491.0	1739.5	1988.0	2236.5
0.42	1.25	100.3	200.5	300.8	401.0	501.3	601.5	701.8	802.0	902.3
0.87	0.81	321.0	642.1	963.1	1284.2	1605.2	1926.3	2247.3	2568.3	2889.4
0.69	0.88	234.4	468.9	703.3	937.7	1172.1	1406.6	1641.0	1875.4	2109.9
0.77	1.27	181.6	363.2	544.8	726.4	907.9	1089.5	1271.1	1452.7	1634.3
0.43	0.86	150.0	300.0	450.1	600.1	750.1	900.1	1050.2	1200.2	1350.2
0.78	1.17	198.5	396.9	595.4	793.8	992.3	1190.8	1389.2	1587.7	1786.1
0.83	0.78	316.8	633.5	950.3	1267.1	1583.8	1900.6	2217.4	2534.1	2850.9
0.48	0.98	146.5	293.0	439.5	586.0	732.5	879.0	1025.5	1172.0	1318.4
0.76	1.09	207.8	415.6	623.4	831.2	1039.0	1246.8	1454.6	1662.4	1870.2
0.57	0.89	190.9	381.7	572.6	763.5	954.4	1145.2	1336.1	1527.0	1717.9
0.81	1.03	234.7	469.3	704.0	938.7	1173.3	1408.0	1642.7	1877.3	2112.0

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of .90% Number of Fibers per cc
0.57	1.09	154.7	309.4	464.0	618.7	773.4	928.1	1082.7	1237.4	1392.1
0.69	1.04	199.4	398.9	598.3	797.7	997.2	1196.6	1396.0	1595.4	1794.9
0.78	1.11	210.9	421.7	632.6	843.5	1054.3	1265.2	1476.1	1686.9	1897.8
0.42	0.73	172.6	345.3	517.9	690.5	863.1	1035.8	1208.4	1381.0	1553.6
0.59	0.95	185.5	371.0	556.4	741.9	927.4	1112.9	1298.3	1483.8	1669.3
0.61	1.20	150.5	301.0	451.5	602.0	752.5	903.0	1053.5	1204.1	1354.6
0.85	1.11	229.8	459.6	689.5	919.3	1149.1	1378.9	1608.8	1838.6	2068.4
0.46	0.88	155.7	311.4	467.1	622.8	778.5	934.2	1089.9	1245.6	1401.3
0.73	0.77	282.6	565.2	847.8	1130.4	1413.0	1695.6	1978.2	2260.8	2543.4
0.57	1.34	126.1	252.2	378.3	504.4	630.6	756.7	882.8	1008.9	1135.0
0.59	0.88	201.0	402.1	603.1	804.2	1005.2	1206.2	1407.3	1608.3	1809.4
0.71	0.99	213.3	426.7	640.0	853.4	1066.7	1280.0	1493.4	1706.7	1920.1
0.64	1.48	128.2	256.5	384.7	513.0	641.2	769.5	897.7	1026.0	1154.2
0.76	1.39	163.3	326.5	489.8	653.0	816.3	979.6	1142.8	1306.1	1469.4
0.68	0.74	275.1	550.2	825.4	1100.5	1375.6	1650.7	1925.8	2200.9	2476.1
0.60	0.82	219.5	438.9	658.4	877.8	1097.3	1316.7	1536.2	1755.6	1975.1
0.81	1.25	192.6	386.1	577.7	770.3	962.8	1155.4	1347.9	1540.5	1733.1
0.52	1.26	123.8	247.6	371.5	495.3	619.1	742.9	866.7	990.6	1114.4
0.47	1.41	99.4	198.8	298.3	397.7	497.1	596.5	695.9	795.4	894.8
0.90	1.46	184.0	368.0	552.0	735.9	919.9	1103.9	1287.9	1471.9	1655.9
0.42	1.21	104.3	208.5	312.8	417.0	521.3	625.6	729.8	834.1	938.3
0.82	0.91	268.7	537.4	806.0	1074.7	1343.4	1612.1	1880.8	2149.4	2418.1
0.74	1.28	171.5	343.0	514.5	686.0	857.4	1028.9	1200.4	1371.9	1543.4
0.87	1.09	237.7	475.5	713.2	951.0	1188.7	1426.4	1664.2	1901.9	2139.7
0.47	1.30	107.2	214.5	321.7	428.9	536.2	643.4	750.7	857.9	965.1
0.49	1.35	108.2	216.4	324.6	432.8	541.0	649.2	757.4	865.6	973.8
0.86	0.91	282.2	564.5	846.7	1129.0	1411.2	1693.4	1975.7	2257.9	2540.2
0.47	1.44	97.0	194.0	291.0	388.1	485.1	582.1	679.1	776.1	873.1
0.61	1.15	157.6	315.2	472.8	630.4	788.0	945.5	1103.1	1260.7	1418.3
0.64	0.82	231.5	462.9	694.4	925.9	1157.3	1388.8	1620.2	1851.7	2083.2
0.44	0.85	154.0	308.1	462.1	616.1	770.2	924.2	1078.2	1232.3	1386.3
0.46	0.97	142.7	285.4	428.1	570.8	713.5	856.2	998.9	1141.6	1284.3
0.65	1.40	138.3	276.5	414.8	553.1	691.4	829.6	967.9	1106.2	1244.5
0.87	1.07	242.8	485.5	728.3	971.0	1213.8	1456.6	1699.3	1942.1	2184.8
0.83	1.36	182.6	365.3	547.9	730.6	913.2	1095.8	1278.5	1461.1	1643.8
0.85	1.10	231.5	463.1	694.6	926.2	1157.7	1389.3	1620.8	1852.4	2083.9
0.51	1.04	147.0	294.0	441.0	587.9	734.9	881.9	1028.9	1175.9	1322.9
0.41	1.33	92.1	184.3	276.4	368.6	460.7	552.8	645.0	737.1	829.2
0.77	1.44	158.8	317.5	476.3	635.0	793.8	952.5	1111.3	1270.0	1428.8
0.71	0.93	227.6	455.5	683.3	911.1	1138.9	1366.6	1594.4	1822.2	2050.0
0.55	1.40	116.9	233.8	350.7	467.6	584.5	701.4	818.3	935.2	1052.1
0.66	1.18	166.1	332.2	498.3	664.4	830.5	996.5	1162.6	1328.7	1494.8
0.80	1.42	168.9	337.7	506.6	675.5	844.4	1013.2	1182.1	1351.0	1519.8
0.74	1.02	215.9	431.7	647.6	863.4	1079.3	1295.1	1511.0	1726.9	1942.7
0.73	1.38	158.3	316.6	474.9	633.2	791.5	949.8	1108.2	1266.5	1424.8
0.79	1.19	198.7	397.5	596.2	795.0	993.7	1192.5	1391.2	1589.9	1788.7
0.43	1.18	108.1	216.2	324.3	432.4	540.5	648.6	756.8	864.9	973.0
0.61	1.27	143.6	287.2	430.8	574.5	718.1	861.7	1005.3	1148.9	1292.5
0.88	1.38	190.4	380.7	571.1	761.5	951.8	1142.2	1332.6	1522.9	1713.3
0.54	0.93	172.8	345.7	518.5	691.4	864.2	1037.1	1209.9	1382.7	1556.6
0.58	1.46	118.8	237.6	356.4	475.2	593.9	712.7	831.5	950.3	1069.1
0.44	0.73	180.0	359.9	539.9	719.8	899.8	1079.7	1259.7	1439.7	1619.6
0.60	0.84	211.7	423.3	635.0	846.7	1058.4	1270.0	1481.7	1693.4	1905.0
0.55	0.76	215.8	431.5	647.3	863.1	1078.8	1294.6	1510.4	1726.1	1941.9
0.78	0.95	245.6	491.3	736.9	982.6	1228.2	1473.9	1719.5	1965.1	2210.8
0.47	1.21	116.3	232.5	348.8	465.1	581.3	697.6	813.9	930.1	1046.4
0.50	1.11	133.1	266.2	399.2	532.3	665.4	798.5	931.6	1064.6	1197.7
0.65	1.46	132.8	265.6	398.4	531.2	664.1	796.9	929.7	1062.5	1195.3
0.75	0.74	300.4	600.8	901.2	1201.6	1502.0	1802.3	2102.7	2403.1	2703.5
0.78	0.82	284.8	569.6	854.3	1139.1	1423.9	1708.7	1993.4	2278.2	2563.0
0.42	0.93	135.8	271.6	407.5	543.3	679.1	814.9	950.7	1086.6	1222.4
0.84	0.87	288.2	576.6	864.8	1153.1	1441.4	1729.7	2018.0	2306.3	2594.5
0.64	0.84	227.5	455.0	682.4	909.9	1137.4	1364.9	1592.4	1819.8	2047.3
0.61	0.95	191.7	383.5	575.2	766.9	958.7	1150.4	1342.1	1533.9	1725.6
0.77	1.15	200.6	401.1	601.7	802.3	1002.8	1203.4	1403.9	1604.5	1806.1
0.84	0.85	293.9	587.8	881.6	1175.5	1469.4	1763.3	2057.2	2351.0	2644.9
0.82	1.03	236.0	472.1	708.1	944.1	1180.2	1416.2	1652.2	1888.3	2124.3
0.61	0.87	208.3	416.6	624.9	833.3	1041.6	1249.9	1458.2	1666.5	1874.8
0.56	1.10	150.1	300.2	450.2	600.3	750.4	900.5	1050.5	1200.6	1350.7
0.51	1.29	117.4	234.7	352.1	469.4	586.8	704.1	821.5	938.8	1056.2
0.80	1.37	175.0	350.0	525.1	700.1	875.1	1050.1	1225.1	1400.2	1575.2
0.62	0.99	186.3	372.5	558.8	745.0	931.3	1117.6	1303.8	1490.1	1676.3
0.85	0.86	296.0	592.0	888.0	1183.9	1479.9	1775.9	2071.9	2367.9	2663.9
0.49	0.85	171.7	343.4	515.1	686.8	858.5	1030.2	1201.9	1373.6	1545.3
0.72	0.74	290.2	580.3	870.5	1160.7	1450.9	1741.0	2031.2	2321.4	2611.5
0.80	1.00	237.7	475.3	713.0	950.6	1188.3	1425.9	1663.6	1901.2	2138.9
0.77	1.30	176.6	353.1	529.7	706.3	882.9	1059.4	1236.0	1412.6	1589.2
0.42	1.31	96.7	193.5	290.2	387.0	483.7	580.4	677.2	773.9	870.7
0.50	0.95	158.2	316.5	474.7	633.0	791.2	949.4	1107.7	1265.9	1424.2
0.67	1.15	174.2	348.4	522.6	696.7	870.9	1045.1	1219.3	1393.5	1567.7
0.65	1.31	147.5	295.1	442.6	590.1	737.7	885.2	1032.7	1180.3	1327.8
0.44	1.36	97.7	195.4	293.2	390.9	488.6	586.3	684.0	781.8	879.5
0.62	1.18	157.1	314.2	471.2	628.3	785.4	942.5	1099.6	1256.6	1413.7
0.90	0.78	345.0	690.0	1035.0	1380.0	1725.0	2070.0	2414.9	2759.9	3104.9
0.45	1.27	106.4	212.8	319.2	425.6	532.0	638.4	744.8	851.2	957.6
0.47	0.90	155.5	310.9	466.4	621.8	777.3	932.7	1088.2	1243.7	1399.1
0.57	1.32	129.2	258.4	387.6	516.8	646.0	775.2	904.4	1033.6	1162.8
0.43	0.91	140.0	280.1	420.1	560.2	700.2	840.2	980.3	1120.3	1260.4
0.73	1.14	191.3	382.5	573.8	765.1	956.4	1147.6	1338.9	1530.2	1721.4

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb of 0.4[illegible] Number of Fibers per cc	Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of .90% Number of Fibers per cc
0.45	0.94	141.2	282.5	423.7	564.9	706.2	847.4	988.6	1129.9	1271.1
0.49	0.87	169.4	338.8	508.2	677.6	847.0	1016.3	1185.7	1355.1	1524.5
0.76	0.96	238.2	476.4	714.6	952.8	1191.0	1429.2	1667.4	1906.6	2143.8
0.59	0.82	214.6	429.2	643.7	858.3	1072.9	1287.5	1502.1	1716.7	1931.2
0.49	1.48	99.2	198.3	297.5	396.7	496.8	595.0	694.2	793.3	892.5
0.48	1.18	120.6	241.2	361.7	482.3	602.9	723.5	844.0	964.6	1085.2
0.46	1.02	134.5	269.0	403.5	538.0	672.5	807.1	941.6	1076.1	1210.6
0.45	1.21	110.1	220.1	330.2	440.3	550.3	660.4	770.5	880.5	990.6
0.68	1.14	178.5	356.9	535.4	713.9	892.3	1070.8	1249.3	1427.7	1606.2
0.59	1.22	142.6	285.3	427.9	570.6	713.2	855.8	998.5	1141.1	1283.7
0.77	0.96	241.0	482.0	722.9	963.9	1204.9	1445.9	1686.8	1927.8	2168.8
0.61	1.04	174.6	349.1	523.7	698.3	872.8	1047.4	1222.0	1396.5	1571.1
0.87	0.82	317.8	635.6	953.3	1271.1	1588.9	1906.7	2224.4	2542.2	2860.0
0.63	1.02	185.2	370.3	555.5	740.6	925.8	1111.0	1296.1	1481.3	1666.4
0.79	0.87	270.8	541.6	812.5	1083.3	1354.1	1624.9	1895.8	2166.6	2437.4
0.41	1.47	83.5	167.0	250.5	334.1	417.6	501.1	584.6	668.1	751.6
0.85	0.76	335.2	670.4	1006.5	1340.7	1675.9	2011.1	2346.3	2681.4	3016.6
0.63	1.07	176.8	353.5	530.3	707.1	883.9	1060.6	1237.4	1414.2	1590.9
0.69	0.91	224.0	448.0	672.0	895.9	1119.9	1343.9	1567.9	1791.9	2015.9
0.47	0.70	201.3	402.6	603.9	805.2	1006.5	1207.8	1409.1	1610.4	1811.8
0.65	1.25	156.0	312.0	468.0	623.9	779.9	935.9	1091.9	1247.9	1403.9
0.57	0.99	172.3	344.7	517.0	689.3	861.6	1034.0	1206.3	1378.6	1550.9
0.43	1.06	121.4	242.7	364.1	485.5	606.9	728.2	849.6	971.0	1092.4
0.78	1.03	226.5	453.1	679.6	906.2	1132.7	1359.2	1585.8	1812.3	2038.8
0.84	1.18	214.1	428.3	642.4	856.6	1070.7	1284.9	1499.0	1713.2	1927.3
0.41	0.87	140.3	280.5	420.8	561.1	701.3	841.6	981.8	1122.1	1262.4
0.42	0.86	145.5	291.1	436.6	582.2	727.7	873.3	1018.8	1164.4	1309.9
0.66	0.88	222.2	444.4	666.6	888.8	1111.0	1333.2	1555.4	1777.6	1999.8
0.70	0.75	275.2	550.3	825.5	1100.7	1375.8	1651.0	1926.1	2201.3	2476.5
0.88	1.14	230.2	460.3	690.5	920.6	1150.8	1380.9	1611.1	1841.2	2071.4
0.54	0.96	167.1	334.2	501.3	668.4	835.6	1002.7	1169.8	1336.9	1504.0
0.86	0.83	312.6	625.2	937.9	1250.5	1563.1	1875.7	2188.4	2501.0	2813.6
0.42	0.86	146.1	292.2	438.3	584.4	730.5	876.6	1022.7	1168.8	1314.9
0.59	1.50	117.9	235.8	353.7	471.6	589.5	707.4	825.2	943.1	1061.0
0.51	1.37	111.2	222.4	333.7	444.9	556.1	667.3	778.5	889.7	1001.0
0.87	0.79	328.1	656.3	984.4	1312.6	1640.7	1968.9	2297.0	2625.2	2953.3
0.46	1.40	97.0	194.0	290.9	387.9	484.9	581.9	678.9	775.8	872.8
0.46	1.01	135.9	271.9	407.8	543.8	679.7	815.6	951.6	1087.5	1223.5
	Averages:	187	374	561	748	936	1123	1310	1497	1684

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 45' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
45*25*8	Dimensions of Room (Ft)	264680000	Room Volume in Cubic Centimeters
9000	Cubic Footage of Room	1040480	Wall Area in Room in Square Centimeters
1120	Wall Area of Room (Sq FT)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	11.2	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft of wall)	6.72	Gallons of ACJC Applied to Walls
		25435.2	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume within ACJC. Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.40	0.79	134.7	269.3	404.0	538.7	673.4	808.0	942.7	1077.4	1212.1
0.58	1.23	124.8	249.6	374.4	499.2	624.0	748.8	873.6	998.4	1123.2
0.63	0.88	189.3	378.6	567.9	757.3	946.6	1135.9	1325.2	1514.5	1703.8
0.62	1.36	122.2	244.3	366.5	488.6	610.8	733.0	855.1	977.3	1099.4
0.83	0.74	297.8	595.7	893.5	1191.4	1489.2	1787.1	2084.9	2382.8	2680.6
0.48	0.86	147.3	294.6	441.9	589.2	736.5	883.8	1031.1	1178.3	1325.6
0.43	0.76	150.1	300.1	450.2	600.3	750.4	900.4	1050.5	1200.6	1350.7
0.61	1.10	146.0	292.0	438.0	584.0	729.9	875.9	1021.9	1167.9	1313.9
0.64	1.17	144.4	288.9	433.3	577.7	722.2	866.6	1011.0	1155.5	1299.9
0.61	0.80	204.5	409.1	613.6	818.1	1022.6	1227.2	1431.7	1636.2	1840.7
0.90	1.35	176.8	353.6	530.3	707.1	883.9	1060.7	1237.5	1414.2	1591.0
0.86	0.99	230.0	460.1	690.1	920.1	1150.2	1380.2	1610.2	1840.3	2070.3
0.43	1.43	79.8	159.7	239.5	319.4	399.2	479.0	558.9	638.7	718.5
0.50	0.74	181.2	362.4	543.6	724.7	905.9	1087.1	1268.3	1449.5	1630.7
0.76	1.22	165.4	330.7	496.1	661.4	826.8	992.2	1157.5	1322.9	1488.2
0.73	0.84	228.2	456.3	684.5	912.7	1140.8	1369.0	1597.1	1825.3	2053.5
0.40	0.72	149.2	298.4	447.6	596.8	746.0	895.2	1044.4	1193.6	1342.8
0.55	0.96	150.9	301.9	452.8	603.7	754.6	905.6	1056.5	1207.4	1358.3
0.56	1.40	106.9	213.8	320.6	427.5	534.4	641.3	748.2	855.0	961.9
0.48	1.08	118.0	236.0	354.0	472.0	589.9	707.9	825.9	943.9	1061.9
0.69	1.21	150.8	301.6	452.4	603.2	754.0	904.8	1055.6	1206.4	1357.2
0.84	1.16	190.5	381.1	571.6	762.1	952.6	1143.2	1333.7	1524.2	1714.7
0.89	1.46	162.7	325.5	488.2	650.9	813.7	976.4	1139.1	1301.9	1464.6
0.58	1.07	142.6	285.2	427.8	570.4	713.0	855.6	998.2	1140.8	1283.4
0.59	1.42	111.1	222.2	333.3	444.5	555.6	666.7	777.8	888.9	1000.0
0.67	1.14	155.9	311.7	467.6	623.5	779.4	935.2	1091.1	1247.0	1402.8
0.85	1.11	202.6	405.1	607.7	810.3	1012.8	1215.4	1418.0	1620.5	1823.1
0.49	0.78	167.6	335.3	502.9	670.5	838.1	1005.8	1173.4	1341.0	1508.6
0.65	1.37	125.8	251.5	377.3	503.0	628.8	754.5	880.3	1006.0	1131.8
0.83	1.49	148.5	296.9	445.4	593.9	742.3	890.8	1039.2	1187.7	1336.2
0.77	1.01	202.2	404.4	606.5	808.7	1010.9	1213.1	1415.3	1617.4	1819.6
0.81	0.83	257.6	515.2	772.9	1030.5	1288.1	1545.7	1803.4	2061.0	2318.6
0.42	1.25	88.1	176.2	264.4	352.5	440.6	528.7	616.9	705.0	793.1
0.88	1.24	188.6	377.2	565.9	754.5	943.1	1131.7	1320.4	1509.0	1697.6
0.48	0.80	158.1	316.2	474.3	632.4	790.5	948.6	1106.7	1264.8	1422.9
0.42	1.37	80.5	161.0	241.5	322.0	402.4	482.9	563.4	643.9	724.4
0.52	0.74	185.3	370.7	556.0	741.3	926.7	1112.0	1297.3	1482.7	1668.0
0.44	0.91	129.5	259.0	388.5	518.0	647.5	777.0	906.4	1035.9	1165.4
0.88	0.80	293.6	587.2	880.9	1174.5	1468.1	1761.7	2055.3	2348.9	2642.6
0.42	1.06	105.8	211.6	317.4	423.2	529.0	634.8	740.5	846.3	952.1
0.84	1.43	156.6	313.2	469.8	626.4	783.0	939.6	1096.3	1252.9	1409.5
0.84	0.77	290.3	580.6	871.0	1161.3	1451.6	1741.9	2032.3	2322.6	2612.9
0.72	1.30	147.2	294.4	441.6	588.8	735.9	883.1	1030.3	1177.5	1324.7
0.77	0.80	256.1	512.1	768.2	1024.2	1280.3	1536.3	1792.4	2048.4	2304.5
0.88	1.20	196.0	392.1	588.1	784.2	980.2	1176.2	1372.3	1568.3	1764.4
0.50	1.20	110.3	220.6	330.9	441.2	551.5	661.8	772.1	882.4	992.7
0.87	1.27	182.8	365.7	548.5	731.4	914.2	1097.0	1279.9	1462.7	1645.6
0.59	1.47	107.2	214.5	321.7	429.0	536.2	643.5	750.7	857.9	965.2
0.63	1.33	126.3	252.6	378.8	505.1	631.4	757.7	884.0	1010.2	1136.5
0.44	1.25	92.5	185.0	277.5	369.9	462.4	554.9	647.4	739.9	832.4
0.45	1.46	82.1	164.3	246.4	328.5	410.6	492.8	574.9	657.0	739.2
0.77	0.95	215.7	431.4	647.1	862.7	1078.4	1294.1	1509.8	1725.5	1941.2
0.53	0.83	169.4	338.9	508.3	677.7	847.1	1016.6	1186.0	1355.4	1524.8
0.86	0.80	282.5	565.0	847.5	1130.0	1412.5	1695.0	1977.5	2260.0	2542.5
0.62	0.96	169.6	339.3	508.9	678.6	848.2	1017.9	1187.5	1357.2	1526.8
0.82	0.73	295.6	591.1	886.7	1182.2	1477.8	1773.4	2068.9	2364.5	2660.1
0.89	1.12	209.9	419.8	629.7	839.7	1049.6	1259.5	1469.4	1679.3	1889.2
0.58	0.75	203.8	407.6	611.4	815.2	1019.0	1222.7	1426.5	1630.3	1834.1
0.82	1.05	206.7	413.4	620.2	826.9	1033.6	1240.3	1447.1	1653.8	1860.5
0.41	0.73	149.0	298.1	447.1	596.1	745.1	894.2	1043.2	1192.2	1341.3
0.76	1.21	166.3	332.6	498.9	665.2	831.5	997.8	1164.1	1330.4	1496.7
0.84	1.01	220.9	441.8	662.7	883.5	1104.4	1325.3	1546.2	1767.1	1988.0
0.42	1.25	89.1	178.2	267.3	356.5	445.6	534.7	623.8	712.9	802.0
0.87	0.81	285.4	570.7	856.1	1141.5	1426.9	1712.2	1997.6	2283.0	2568.3
0.69	0.88	208.4	416.8	625.1	833.5	1041.9	1250.3	1458.7	1667.0	1875.4
0.77	1.27	161.4	322.8	484.2	645.6	807.1	968.5	1129.9	1291.3	1452.7
0.43	0.86	133.4	266.7	400.1	533.4	666.8	800.1	933.5	1066.8	1200.2
0.78	1.17	176.4	352.8	529.2	705.6	882.0	1058.5	1234.9	1411.3	1587.7
0.83	0.78	281.6	563.1	844.7	1126.3	1407.9	1689.4	1971.0	2252.6	2534.1
0.48	0.98	130.2	260.4	390.7	520.9	651.1	781.3	911.5	1041.7	1172.0
0.76	1.09	184.7	369.4	554.1	738.8	923.5	1108.2	1293.0	1477.7	1662.4
0.57	0.89	169.7	339.3	509.0	678.7	848.3	1018.0	1187.7	1357.3	1527.0
0.81	1.03	208.6	417.2	625.8	834.4	1043.0	1251.6	1460.2	1668.8	1877.3

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of 50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.57	1.09	137.5	275.0	412.5	560.0	687.4	824.9	962.4	1099.9	1237.4
0.69	1.04	177.3	354.5	531.8	709.1	886.4	1063.6	1240.9	1418.2	1595.4
0.78	1.11	187.4	374.9	562.3	749.7	937.2	1124.6	1312.0	1499.5	1686.9
0.42	0.73	153.4	306.9	460.3	613.8	767.2	920.7	1074.1	1227.6	1381.0
0.59	0.96	164.9	329.7	494.6	659.5	824.3	989.2	1154.1	1318.9	1483.8
0.61	1.20	133.8	267.6	401.4	535.1	668.9	802.7	936.5	1070.3	1204.1
0.85	1.11	204.3	408.6	612.9	817.2	1021.4	1225.7	1430.0	1634.3	1838.6
0.46	0.88	138.4	276.8	415.2	553.6	692.0	830.4	968.8	1107.2	1245.6
0.73	0.77	251.2	502.4	753.6	1004.8	1256.0	1507.2	1758.4	2009.6	2260.8
0.57	1.34	112.1	224.2	336.3	448.4	560.5	672.6	784.7	896.8	1008.9
0.59	0.88	178.7	357.4	536.1	714.8	893.5	1072.2	1250.9	1429.6	1608.3
0.71	0.99	189.6	379.3	568.9	758.5	948.2	1137.8	1327.4	1517.1	1706.7
0.64	1.48	114.0	228.0	342.0	456.0	570.0	684.0	798.0	912.0	1026.0
0.76	1.39	145.1	290.2	435.4	580.5	725.6	870.7	1015.8	1161.0	1306.1
0.68	0.74	244.5	489.1	733.6	978.2	1222.7	1467.3	1711.8	1956.4	2200.9
0.60	0.82	195.1	390.1	585.2	780.3	975.3	1170.4	1365.5	1560.5	1755.6
0.81	1.25	171.2	342.3	513.5	684.7	855.8	1027.0	1198.2	1369.3	1540.5
0.52	1.26	110.1	220.1	330.2	440.2	550.3	660.4	770.4	880.5	990.6
0.47	1.41	88.4	176.7	265.1	353.5	441.9	530.2	618.6	707.0	795.4
0.90	1.46	163.5	327.1	490.6	654.2	817.7	981.3	1144.8	1308.3	1471.9
0.42	1.21	92.7	185.3	278.0	370.7	463.4	556.0	648.7	741.4	834.1
0.82	0.91	238.8	477.7	716.5	955.3	1194.1	1433.0	1671.8	1910.6	2149.4
0.74	1.28	152.4	304.9	457.3	609.7	762.2	914.6	1067.0	1219.5	1371.9
0.87	1.09	211.3	422.6	634.0	845.3	1056.6	1267.9	1479.3	1690.6	1901.9
0.47	1.30	95.3	190.6	286.0	381.3	476.6	571.9	667.3	762.6	857.9
0.49	1.36	96.2	192.4	288.5	384.7	480.9	577.1	673.2	769.4	865.6
0.86	0.91	250.9	501.8	752.6	1003.5	1254.4	1505.3	1756.2	2007.0	2257.9
0.47	1.44	86.2	172.5	258.7	344.9	431.2	517.4	603.7	689.9	776.1
0.61	1.15	140.1	280.2	420.2	560.3	700.4	840.5	980.6	1120.6	1260.7
0.64	0.82	206.7	411.5	617.2	823.0	1028.7	1234.5	1440.2	1646.0	1851.7
0.44	0.85	136.9	273.8	410.8	547.7	684.6	821.5	958.4	1095.4	1232.3
0.46	0.97	126.8	253.7	380.5	507.4	634.2	761.1	887.9	1014.8	1141.6
0.65	1.40	122.9	245.8	368.7	491.6	614.5	737.5	860.4	983.3	1106.2
0.87	1.07	215.8	431.6	647.4	863.1	1078.9	1294.7	1510.5	1726.3	1942.1
0.83	1.36	162.3	324.7	487.0	649.4	811.7	974.1	1136.4	1298.8	1461.1
0.85	1.10	205.8	411.6	617.5	823.3	1029.1	1234.9	1440.7	1646.5	1852.4
0.51	1.04	130.7	261.3	392.0	522.6	653.3	783.9	914.6	1045.2	1175.9
0.41	1.33	81.9	163.8	245.7	327.6	409.5	491.4	573.3	655.2	737.1
0.77	1.44	141.1	282.2	423.3	564.5	705.6	846.7	987.8	1128.9	1270.0
0.71	0.93	202.5	404.9	607.4	809.9	1012.3	1214.8	1417.3	1619.7	1822.2
0.55	1.40	103.9	207.8	311.7	415.6	519.6	623.5	727.4	831.3	935.2
0.66	1.18	147.6	295.3	442.9	590.5	738.2	885.8	1033.5	1181.1	1328.7
0.80	1.42	150.1	300.2	450.3	600.4	750.5	900.6	1050.7	1200.9	1351.0
0.74	1.02	191.9	383.7	575.6	767.5	959.4	1151.2	1343.1	1535.0	1726.9
0.73	1.38	140.7	281.4	422.2	562.9	703.6	844.3	985.0	1125.7	1266.5
0.79	1.19	176.7	353.3	530.0	706.6	883.3	1060.0	1236.6	1413.3	1589.9
0.43	1.18	96.1	192.2	288.3	384.4	480.5	576.6	672.7	768.8	864.9
0.61	1.27	127.7	255.3	383.0	510.6	638.3	766.0	893.6	1021.3	1148.9
0.88	1.38	169.2	338.4	507.6	676.9	846.1	1015.3	1184.5	1353.7	1522.9
0.54	0.93	153.6	307.3	460.9	614.6	768.2	921.8	1075.5	1229.1	1382.7
0.58	1.46	105.6	211.2	316.8	422.4	528.0	633.5	739.1	844.7	950.3
0.44	0.73	160.0	319.9	479.9	639.9	799.8	959.8	1119.7	1279.7	1439.7
0.60	0.84	188.2	376.3	564.5	752.6	940.8	1128.9	1317.1	1505.2	1693.4
0.55	0.76	191.8	383.6	575.4	767.2	959.0	1150.8	1342.5	1534.3	1726.1
0.78	0.95	218.3	436.7	655.0	873.4	1091.7	1310.1	1528.4	1746.8	1965.1
0.47	1.21	103.3	206.7	310.0	413.4	516.7	620.1	723.4	826.8	930.1
0.50	1.11	118.3	236.6	354.9	473.2	591.5	709.8	828.0	946.3	1064.6
0.65	1.46	118.1	236.1	354.2	472.2	590.3	708.3	826.4	944.4	1062.5
0.75	0.74	267.0	534.0	801.0	1068.1	1335.1	1602.1	1869.1	2136.1	2403.1
0.78	0.82	253.1	506.3	759.4	1012.5	1265.7	1518.8	1771.9	2025.1	2278.2
0.42	0.93	120.7	241.5	362.2	482.9	603.6	724.4	845.1	965.8	1086.6
0.84	0.87	256.3	512.5	768.8	1025.0	1281.3	1537.5	1793.8	2050.0	2306.3
0.64	0.64	202.2	404.4	606.6	808.8	1011.0	1213.2	1415.4	1617.6	1819.8
0.61	0.95	170.4	340.9	511.3	681.7	852.2	1022.6	1193.0	1363.4	1533.9
0.77	1.15	178.3	356.6	534.8	713.1	891.4	1069.7	1248.0	1426.2	1604.5
0.84	0.85	261.2	522.5	783.7	1044.9	1306.1	1567.4	1828.6	2089.8	2351.0
0.82	1.03	209.8	419.6	629.4	839.2	1049.0	1258.8	1468.7	1678.5	1888.3
0.61	0.87	185.2	370.3	555.5	740.7	925.8	1111.0	1296.2	1481.4	1666.5
0.56	1.10	133.4	266.8	400.2	533.6	667.0	800.4	933.8	1067.2	1200.6
0.51	1.29	104.3	208.6	312.9	417.3	521.6	625.9	730.2	834.5	938.8
0.80	1.37	155.6	311.1	466.7	622.3	777.9	933.4	1089.0	1244.6	1400.2
0.62	0.99	165.6	331.1	496.7	662.3	827.8	993.4	1158.9	1324.5	1490.1
0.85	0.86	263.1	526.2	789.3	1052.4	1315.5	1578.6	1841.7	2104.8	2367.9
0.49	0.85	152.6	305.2	457.9	610.5	763.1	915.7	1068.3	1220.9	1373.6
0.72	0.74	257.9	515.9	773.8	1031.7	1289.6	1547.6	1805.5	2063.4	2321.4
0.80	1.00	211.2	422.5	633.7	845.0	1056.2	1267.5	1478.7	1690.0	1901.2
0.77	1.30	157.0	313.9	470.9	627.8	784.8	941.7	1098.7	1255.6	1412.6
0.42	1.31	86.0	172.0	258.0	344.0	430.0	515.9	601.9	687.9	773.9
0.50	0.95	140.7	281.3	422.0	562.6	703.3	844.0	984.6	1125.3	1265.9
0.67	1.15	154.8	309.7	464.5	619.3	774.2	929.0	1083.8	1238.7	1393.5
0.65	1.31	131.1	262.3	393.4	524.6	655.7	786.8	918.0	1049.1	1180.3
0.44	1.36	86.9	173.7	260.6	347.5	434.3	521.2	608.0	694.9	781.8
0.62	1.18	139.6	279.3	418.9	558.5	698.1	837.8	977.4	1117.0	1256.6
0.90	0.78	306.7	613.3	920.0	1226.6	1533.3	1840.0	2146.6	2453.3	2759.9
0.45	1.27	94.6	189.2	283.7	378.3	472.9	567.5	662.0	756.6	851.2
0.47	0.90	138.2	276.4	414.6	552.7	690.9	829.1	967.3	1105.5	1243.7
0.57	1.32	114.8	229.7	344.5	459.4	574.2	689.0	803.9	918.7	1033.6
0.43	0.91	124.5	249.0	373.4	497.9	622.4	746.9	871.4	995.8	1120.3
0.73	1.14	170.0	340.0	510.1	680.1	850.1	1020.1	1190.1	1360.1	1530.2

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10%. Number of Fibers per cc	For Asb Content of 0.20%. Number of Fibers per cc	For Asb Content of 0.30%. Number of Fibers per cc	For Asb Content of 0.40%. Number of Fibers per cc	For Asb Content of .50%. Number of Fibers per cc	For Asb Content of 0.60%. Number of Fibers per cc	For Asb Content of 0.70%. Number of Fibers per cc	For Asb Content of 0.80%. Number of Fibers per cc	For Asb Content of .90%. Number of Fibers per cc
0.45	0.94	125.5	251.1	376.6	502.2	627.7	753.2	878.8	1004.3	1129.9
0.49	0.87	150.6	301.1	451.7	602.3	752.9	903.4	1054.0	1204.6	1355.1
0.76	0.96	211.7	423.5	635.2	846.9	1058.7	1270.4	1482.2	1693.9	1905.6
0.59	0.82	190.7	381.5	572.2	763.0	953.7	1144.4	1335.2	1525.9	1716.7
0.49	1.48	88.1	176.3	264.4	352.6	440.7	528.9	617.0	705.2	793.3
0.48	1.18	107.2	214.4	321.5	428.7	535.9	643.1	750.3	857.4	964.6
0.46	1.02	119.6	239.1	358.7	478.3	597.8	717.4	836.9	956.5	1076.1
0.45	1.21	97.8	196.7	293.5	391.3	489.2	587.0	684.9	782.7	880.5
0.68	1.14	158.6	317.3	475.9	634.6	793.2	951.8	1110.5	1269.1	1427.7
0.59	1.22	126.8	253.6	380.4	507.2	633.9	760.7	887.5	1014.3	1141.1
0.77	0.96	214.2	428.4	642.6	856.8	1071.0	1285.2	1499.4	1713.6	1927.8
0.61	1.04	156.2	310.3	465.5	620.7	775.9	931.0	1086.2	1241.4	1396.5
0.87	0.82	282.5	564.9	847.4	1129.9	1412.3	1694.8	1977.3	2259.7	2542.2
0.63	1.02	164.6	329.2	493.8	658.3	822.9	987.5	1152.1	1316.7	1481.3
0.79	0.87	240.7	481.5	722.2	962.9	1203.7	1444.4	1685.1	1925.9	2166.6
0.41	1.47	74.2	148.5	222.7	296.9	371.2	445.4	519.7	593.9	668.1
0.85	0.76	297.9	595.9	893.8	1191.7	1489.7	1787.6	2085.6	2383.5	2681.4
0.63	1.07	157.1	314.3	471.4	628.5	785.7	942.8	1099.9	1257.0	1414.2
0.69	0.91	199.1	398.2	597.3	796.4	995.5	1194.6	1393.7	1592.8	1791.9
0.47	0.70	178.9	357.9	536.8	715.8	894.7	1073.6	1252.6	1431.5	1610.4
0.65	1.25	138.7	277.3	416.0	554.6	693.3	831.9	970.6	1109.2	1247.9
0.57	0.99	153.2	306.4	459.5	612.7	765.9	919.1	1072.3	1225.4	1378.6
0.43	1.06	107.9	215.8	323.7	431.5	539.4	647.3	755.2	863.1	971.0
0.78	1.03	201.4	402.7	604.1	805.5	1006.8	1208.2	1409.6	1610.9	1812.3
0.84	1.18	190.4	380.7	571.1	761.4	951.8	1142.1	1332.5	1522.8	1713.2
0.41	0.87	124.7	249.4	374.0	498.7	623.4	748.1	872.8	997.4	1122.1
0.42	0.86	129.4	258.7	388.1	517.5	646.9	776.2	905.6	1035.0	1164.4
0.66	0.88	197.5	395.0	592.5	790.1	987.6	1185.1	1382.6	1580.1	1777.6
0.70	0.75	244.6	489.2	733.8	978.4	1222.9	1467.5	1712.1	1956.7	2201.3
0.88	1.14	204.6	409.2	613.7	818.3	1022.9	1227.5	1432.1	1636.6	1841.2
0.54	0.96	148.5	297.1	445.6	594.2	742.7	891.3	1039.8	1188.4	1336.9
0.86	0.83	277.9	555.8	833.7	1111.5	1389.4	1667.3	1945.2	2223.1	2501.0
0.42	0.86	129.9	259.7	389.6	519.4	649.3	779.2	909.0	1038.9	1168.8
0.59	1.50	104.8	209.6	314.4	419.2	524.0	628.8	733.6	838.3	943.1
0.51	1.37	98.9	197.7	296.6	395.4	494.3	593.2	692.0	790.9	889.7
0.87	0.79	291.7	583.4	875.1	1166.8	1458.4	1750.1	2041.8	2333.5	2625.2
0.46	1.40	86.2	172.4	258.6	344.8	431.0	517.2	603.4	689.6	775.8
0.46	1.01	120.8	241.7	362.5	483.3	604.2	725.0	845.9	966.7	1087.5
	Averages:	166	333	499	665	832	998	1164	1331	1497

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 50 ' 25 ' 8 FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
50*25*8	Dimensions of Room (F)	[illegible]	[illegible]
10000	Cubic Footage of Room	[illegible]	[illegible]
1200	Wall Area of Room (Sq FT)	[illegible]	[illegible]
100	Demolition Rate (Sq Ft/Hr)	[illegible]	[illegible]
3	ACJC Application Rate (gal/Mil Sq Ft at mil)	[illegible]	[illegible]

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Hours Low	For Asb Content of 0.25% Number of Hours Low	For Asb Content of [illegible]% Number of Hours Low	For Asb Content of [illegible]% Number of Hours Low	For Asb Content of [illegible]% Number of Hours Low	For Asb Content of [illegible]% Number of Hours Low	For Asb Content of [illegible]% Number of Hours Low	For Asb Content of [illegible]% Number of Hours Low	For Asb Content of [illegible]% Number of Hours Low
0.40	0.79	121.2	242.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.58	1.23	112.3	224.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.63	0.88	170.4	340.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.62	1.36	109.9	219.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.63	0.74	268.1	536.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.48	0.86	152.6	305.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.43	0.76	135.1	270.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.61	1.10	131.4	262.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.64	1.17	130.0	260.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.61	0.80	184.1	368.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.90	1.36	159.1	318.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.86	0.99	207.0	414.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.43	1.43	71.9	143.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.50	0.74	163.1	326.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.76	1.22	148.8	297.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.73	0.84	205.3	410.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.40	0.72	134.3	268.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.56	0.96	136.8	273.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.56	1.40	96.2	192.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.48	1.08	106.2	212.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.69	1.21	135.7	271.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.84	1.16	171.5	342.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.89	1.46	146.5	292.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.58	1.07	128.3	256.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.59	1.42	100.0	200.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.67	1.14	140.3	280.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.84	1.11	182.3	364.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.49	0.78	150.9	301.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.65	1.37	113.2	226.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.83	1.49	133.6	267.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.77	1.01	182.0	363.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.81	0.83	231.9	463.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.42	1.25	79.3	158.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.88	1.24	169.8	339.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.48	0.80	142.3	284.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.42	1.37	72.4	144.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.52	0.74	166.8	333.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.44	0.91	116.5	233.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.88	0.80	264.3	528.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.42	1.06	95.2	190.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.84	1.43	140.9	281.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.84	0.77	261.3	522.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.72	1.30	132.5	264.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.77	0.80	230.4	460.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.88	1.20	176.4	352.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.50	1.20	99.3	198.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.87	1.27	164.6	329.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.59	1.47	96.5	193.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.63	1.33	113.7	227.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.44	1.25	83.2	166.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.45	1.46	73.9	147.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.77	0.95	194.1	388.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.53	0.83	152.5	305.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.86	0.80	254.2	508.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.62	0.96	152.7	305.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.82	0.73	266.0	532.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.89	1.12	188.9	377.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.58	0.75	183.4	366.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.82	1.05	186.1	372.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.41	0.73	134.1	268.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.76	1.21	149.7	299.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.84	1.01	198.8	397.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.42	1.25	80.2	160.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.87	0.81	256.8	513.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.69	0.88	187.5	375.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.77	1.27	145.3	290.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.43	0.86	120.0	240.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.78	1.17	158.8	317.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.83	0.78	253.4	506.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.48	0.98	117.2	234.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.76	1.09	166.2	332.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.57	0.89	152.7	305.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.81	1.03	187.7	375.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of 50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.57	1.09	123.7	247.5	371.2	495.0	618.7	742.4	866.2	989.9	1113.7
0.69	1.04	159.5	319.1	478.6	638.2	797.7	957.3	1116.8	1276.4	1435.9
0.78	1.11	168.7	337.4	506.1	674.8	843.5	1012.1	1180.8	1349.5	1518.2
0.42	0.73	138.1	276.2	414.3	552.4	690.5	828.6	966.7	1104.8	1242.9
0.59	0.96	148.4	296.8	445.1	593.5	741.9	890.3	1038.7	1187.0	1335.4
0.61	1.20	120.4	240.8	361.2	481.6	602.0	722.4	842.8	963.2	1083.6
0.86	1.11	183.9	367.7	551.6	735.4	919.3	1103.2	1287.0	1470.9	1654.7
0.46	0.88	124.6	249.1	373.7	498.2	622.8	747.3	871.9	996.4	1121.0
0.73	0.77	226.1	452.2	678.2	904.3	1130.4	1356.5	1582.6	1808.7	2034.7
0.57	1.34	100.9	201.8	302.7	403.6	504.4	605.3	706.2	807.1	908.0
0.59	0.88	160.8	321.7	482.5	643.3	804.2	965.0	1125.8	1286.6	1447.5
0.71	0.99	170.7	341.3	512.0	682.7	853.4	1024.0	1194.7	1365.4	1536.0
0.64	1.48	102.6	205.2	307.8	410.4	513.0	615.6	718.2	820.8	923.4
0.76	1.39	130.6	261.2	391.8	522.4	653.0	783.7	914.3	1044.9	1175.5
0.66	0.74	220.1	440.2	660.3	880.4	1100.5	1320.6	1540.7	1760.8	1980.8
0.60	0.82	175.6	351.1	526.7	702.2	877.8	1053.4	1228.9	1404.5	1580.1
0.81	1.25	154.1	308.1	462.2	616.2	770.3	924.3	1078.4	1232.4	1386.5
0.52	1.26	99.1	198.1	297.2	396.2	495.3	594.3	693.4	792.4	891.5
0.47	1.41	79.5	159.1	238.6	318.1	397.7	477.2	556.7	636.3	715.8
0.90	1.46	147.2	294.4	441.6	588.8	735.9	883.1	1030.3	1177.5	1324.7
0.42	1.21	83.4	166.8	250.2	333.6	417.0	500.4	583.8	667.3	750.7
0.82	0.91	214.9	429.9	644.8	859.8	1074.7	1289.7	1504.6	1719.5	1934.5
0.74	1.28	137.2	274.4	411.6	548.8	686.0	823.1	960.3	1097.5	1234.7
0.87	1.09	190.2	380.4	570.6	760.8	951.0	1141.1	1331.3	1521.5	1711.7
0.47	1.30	86.8	171.6	257.4	343.2	428.9	514.7	600.5	686.3	772.1
0.49	1.36	86.6	173.1	259.7	346.2	432.8	519.4	605.9	692.5	779.0
0.86	0.91	225.8	451.6	677.4	903.2	1129.0	1354.7	1580.5	1806.3	2032.1
0.47	1.44	77.6	155.2	232.8	310.5	388.1	465.7	543.3	620.9	698.5
0.61	1.15	126.1	252.1	378.2	504.3	630.4	756.4	882.5	1008.6	1134.6
0.66	0.82	186.2	370.3	555.5	740.7	925.9	1111.0	1296.2	1481.4	1666.5
0.44	0.86	123.2	246.5	369.7	492.9	616.1	739.4	862.6	985.8	1109.0
0.48	0.97	114.2	228.3	342.5	456.6	570.8	685.0	799.1	913.3	1027.5
0.66	1.40	110.6	221.2	331.9	442.5	553.1	663.7	774.3	884.9	995.6
0.87	1.07	194.2	388.4	582.6	776.8	971.0	1165.2	1359.4	1553.7	1747.9
0.63	1.36	146.1	292.2	438.3	584.4	730.6	876.7	1022.8	1168.9	1315.0
0.86	1.10	166.2	370.5	555.7	740.9	926.2	1111.4	1296.6	1481.9	1667.1
0.51	1.04	117.6	235.2	352.8	470.4	587.9	705.5	823.1	940.7	1058.3
0.41	1.33	73.7	147.4	221.1	294.8	368.6	442.3	516.0	589.7	663.4
0.71	1.44	127.0	254.0	381.0	508.0	635.0	762.0	889.0	1016.0	1143.0
0.73	0.93	182.2	364.4	546.7	728.9	911.1	1093.3	1275.5	1457.8	1640.0
0.56	1.40	[illegible]	187.0	280.6	374.1	467.6	561.1	654.6	748.2	841.7
0.68	1.18	132.9	266.7	398.6	531.5	664.4	797.2	930.1	1063.0	1195.9
0.80	1.42	135.1	270.2	405.3	540.4	675.5	810.6	945.7	1080.8	1215.9
0.78	1.02	172.7	345.4	518.1	690.7	863.4	1036.1	1208.8	1381.5	1554.2
0.75	1.38	126.6	253.3	379.9	506.6	633.2	759.9	886.5	1013.2	1139.8
0.79	1.19	159.0	318.0	477.0	636.0	795.0	954.0	1113.0	1271.9	1430.9
0.69	1.18	86.5	173.0	259.5	345.9	432.4	518.9	605.4	691.9	778.4
0.61	1.27	114.9	229.8	344.7	459.6	574.5	689.4	804.2	919.1	1034.0
0.80	1.38	152.3	304.6	456.9	609.2	761.5	913.7	1066.0	1218.3	1370.6
0.76	0.93	138.3	276.5	414.8	553.1	691.4	829.6	967.9	1106.2	1244.5
0.78	1.48	95.0	190.1	285.1	380.1	475.2	570.2	665.2	760.2	855.3
0.64	0.73	144.0	287.9	431.9	575.9	719.8	863.8	1007.8	1151.7	1295.7
0.80	0.88	169.3	338.7	508.0	677.3	846.7	1016.0	1185.4	1354.7	1524.0
0.78	0.78	172.6	345.2	517.8	690.5	863.1	1035.7	1208.3	1380.9	1553.5
0.78	0.95	196.5	393.0	589.5	786.1	982.6	1179.1	1375.6	1572.1	1768.6
0.67	1.21	93.0	186.0	279.0	372.1	465.1	558.1	651.1	744.1	837.1
0.90	1.11	106.5	212.9	319.4	425.9	532.3	638.8	745.2	851.7	958.2
0.68	1.48	106.2	212.5	318.7	425.0	531.2	637.5	743.7	850.0	956.2
0.75	0.74	240.3	480.6	720.9	961.3	1201.6	1441.9	1682.2	1922.5	2162.8
0.78	0.82	227.8	455.6	683.5	911.3	1139.1	1366.9	1594.8	1822.6	2050.4
0.82	0.93	108.7	217.3	326.0	434.6	543.3	651.9	760.6	869.2	977.9
0.68	0.87	230.6	461.3	691.9	922.5	1153.1	1383.8	1614.4	1845.0	2075.6
0.66	0.96	182.0	364.0	546.0	727.9	909.9	1091.9	1273.9	1455.9	1637.9
0.61	0.95	153.4	306.8	460.2	613.6	766.9	920.3	1073.7	1227.1	1380.5
0.77	1.15	160.5	320.9	481.4	641.8	802.3	962.7	1123.2	1283.6	1444.1
0.68	0.98	235.1	470.2	705.3	940.4	1175.5	1410.6	1645.7	1880.8	2115.9
0.82	1.30	188.8	377.7	566.5	755.3	944.1	1133.0	1321.8	1510.6	1699.4
0.81	0.87	166.7	333.3	500.0	666.6	833.3	999.9	1166.6	1333.2	1499.9
0.78	1.10	120.1	240.1	360.2	480.2	600.3	720.4	840.4	960.5	1080.6
0.91	1.09	93.9	187.8	281.6	375.5	469.4	563.3	657.2	751.1	844.9
0.88	1.37	140.0	280.0	420.0	560.1	700.1	840.1	980.1	1120.1	1260.1
0.82	0.99	149.0	298.0	447.0	596.0	745.0	894.0	1043.1	1192.1	1341.1
0.88	0.88	236.8	473.6	710.4	947.1	1183.9	1420.7	1657.5	1894.3	2131.1
0.99	0.88	137.4	274.7	412.1	549.4	686.8	824.1	961.5	1098.8	1236.2
0.72	0.74	232.1	464.3	696.4	928.5	1160.7	1392.8	1625.0	1857.1	2089.2
0.88	1.20	190.1	380.2	570.4	760.5	950.6	1140.7	1330.9	1521.0	1711.1
0.77	1.10	141.3	282.5	423.8	565.0	706.3	847.5	988.8	1130.1	1271.3
0.82	1.31	77.4	154.8	232.2	309.6	387.0	464.4	541.7	619.1	696.5
0.93	0.98	126.6	253.2	379.8	506.4	633.0	759.6	886.2	1012.7	1139.3
0.67	1.15	139.1	278.7	418.0	557.4	696.7	836.1	975.4	1114.8	1254.1
0.68	1.31	118.0	236.1	354.1	472.1	590.1	708.2	826.2	944.2	1062.2
1.68	1.38	78.2	156.4	234.5	312.7	390.9	469.1	547.2	625.4	703.6
0.62	1.18	125.7	251.3	377.0	502.7	628.3	754.0	879.6	1005.3	1131.0
0.98	0.78	276.0	552.0	828.0	1104.0	1380.0	1656.0	1932.0	2208.0	2483.9
1.48	1.27	85.1	170.2	255.4	340.5	425.6	510.7	595.8	681.0	766.1
0.87	0.98	124.4	248.7	373.1	497.5	621.8	746.2	870.6	994.9	1119.3
0.57	1.32	108.4	216.7	310.1	413.4	516.8	620.1	723.5	826.8	930.2
0.85	0.91	112.0	224.1	336.1	448.1	560.2	672.2	784.2	896.3	1008.3
0.73	1.14	153.0	306.0	459.0	612.1	765.1	918.1	1071.1	1224.1	1377.1

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of 50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.45	0.94	113.0	226.0	339.0	451.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.49	0.87	136.5	271.0	406.5	542.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.76	0.95	190.6	381.1	571.7	762.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.59	0.82	171.7	343.3	515.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.49	1.46	79.3	158.7	238.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.48	1.18	96.5	192.9	289.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.46	1.02	107.6	215.2	322.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.45	1.21	88.1	176.1	264.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.68	1.14	142.8	285.5	428.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.59	1.22	114.1	228.2	342.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.77	0.96	192.8	385.6	578.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.61	1.04	139.7	279.3	419.0	558.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.87	0.82	254.2	508.4	762.7	1016.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.63	1.02	148.1	296.3	444.4	592.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.79	0.87	216.7	433.3	650.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.41	1.47	66.8	133.6	200.4	267.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.85	0.76	268.1	536.3	804.4	1072.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.63	1.07	141.4	282.8	424.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.69	0.91	179.2	358.4	537.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.47	0.70	161.0	322.1	483.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.65	1.25	124.8	249.6	374.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.57	0.99	137.9	275.7	413.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.43	1.06	97.1	194.2	291.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.78	1.03	181.2	362.5	543.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.84	1.18	171.3	342.6	514.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.41	0.87	112.2	224.4	336.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.42	0.86	116.4	232.9	349.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.66	0.88	177.8	355.5	533.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.70	0.75	220.1	440.3	660.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.88	1.14	184.1	368.2	552.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.54	0.96	133.7	267.4	401.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.86	0.83	250.1	500.2	750.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.42	0.86	116.9	233.8	350.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.59	1.50	94.3	188.6	282.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.51	1.37	89.0	177.9	266.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.87	0.79	262.5	525.0	787.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.46	1.40	77.6	155.2	232.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.46	1.01	108.8	217.5	326.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Averages	150	299	449	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 60' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
60*25*8	Dimensions of Room (Ft)	339840000	Room Volume in Cubic Centimeters
12000	Cubic Footage of Room	1263440	Wall Area in Room in Square Centimeters
1360	Wall Area of Room (Sq FT)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	13.6	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft of wall)	8.16	Gallons of ACJC Applied to Walls
		30885.6	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume within ACJC, Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.40	0.79	101.0	202.0	303.0	404.0	505.0	606.0	707.0	808.0	909.1
0.58	1.23	93.6	187.2	280.8	374.4	468.0	561.6	655.2	748.8	842.4
0.63	0.88	142.0	284.0	426.0	567.9	709.9	851.9	993.9	1135.9	1277.9
0.62	1.36	91.6	183.2	274.9	366.5	458.1	549.7	641.3	733.0	824.6
0.83	0.74	223.4	446.8	670.2	893.5	1116.9	1340.3	1563.7	1787.1	2010.5
0.48	0.86	110.5	220.9	331.4	441.9	552.3	662.8	773.3	883.8	994.2
0.43	0.76	112.6	225.1	337.7	450.2	562.8	675.3	787.9	900.4	1013.0
0.61	1.10	109.5	219.0	328.5	438.0	547.5	656.9	766.4	875.9	985.4
0.64	1.17	108.3	216.6	325.0	433.3	541.6	649.9	758.3	866.6	974.9
0.61	0.80	153.4	306.8	460.2	613.6	767.0	920.4	1073.8	1227.2	1380.6
0.90	1.35	132.6	265.2	397.8	530.3	662.9	795.5	928.1	1060.7	1193.3
0.86	0.99	172.5	345.0	517.6	690.1	862.6	1035.1	1207.7	1380.2	1552.7
0.43	1.43	59.9	119.8	179.6	239.5	299.4	359.3	419.2	479.0	538.9
0.50	0.74	135.9	271.8	407.7	543.6	679.4	815.3	951.2	1087.1	1223.0
0.76	1.22	124.0	248.0	372.1	496.1	620.1	744.1	868.1	992.2	1116.2
0.73	0.84	171.1	342.2	513.4	684.5	855.6	1026.7	1197.9	1369.0	1540.1
0.40	0.72	111.9	223.8	335.7	447.6	559.5	671.4	783.3	895.2	1007.1
0.56	0.96	113.2	226.4	339.6	452.8	566.0	679.2	792.4	905.6	1018.8
0.56	1.40	80.2	160.3	240.5	320.6	400.8	481.0	561.1	641.3	721.4
0.48	1.08	88.5	177.0	265.5	354.0	442.5	530.9	619.4	707.9	796.4
0.69	1.21	113.1	226.2	339.3	452.4	565.5	678.6	791.7	904.8	1017.9
0.84	1.16	142.9	285.8	428.7	571.6	714.5	857.4	1000.3	1143.2	1286.0
0.89	1.46	122.0	244.1	366.1	488.2	610.2	732.3	854.3	976.4	1098.4
0.58	1.07	106.9	213.9	320.8	427.8	534.7	641.7	748.6	855.6	962.5
0.59	1.42	83.3	166.7	250.0	333.3	416.7	500.0	583.4	666.7	750.0
0.67	1.14	116.9	233.8	350.7	467.6	584.5	701.4	818.3	935.2	1052.1
0.85	1.11	151.9	303.8	455.8	607.7	759.6	911.5	1063.5	1215.4	1367.3
0.49	0.78	125.7	251.4	377.2	502.9	628.6	754.3	880.0	1005.8	1131.5
0.66	1.37	94.3	188.6	282.9	377.3	471.6	565.9	660.2	754.5	848.8
0.83	1.49	111.3	222.7	334.0	445.4	556.7	668.1	779.4	890.8	1002.1
0.77	1.01	151.6	303.3	454.9	606.5	758.2	909.8	1061.5	1213.1	1364.7
0.81	0.83	193.2	386.4	579.6	772.9	966.1	1159.3	1352.5	1545.7	1738.9
0.42	1.25	66.1	132.2	198.3	264.4	330.5	396.6	462.6	528.7	594.8
0.88	1.24	141.5	282.9	424.4	565.9	707.3	848.8	990.3	1131.7	1273.2
0.48	0.80	118.6	237.1	355.7	474.3	592.9	711.4	830.0	948.6	1067.1
0.42	1.37	60.4	120.7	181.1	241.5	301.8	362.2	422.6	482.9	543.3
0.52	0.74	139.0	278.0	417.0	556.0	695.0	834.0	973.0	1112.0	1251.0
0.44	0.91	97.1	194.2	291.4	388.5	485.6	582.7	679.8	777.0	874.1
0.88	0.80	220.2	440.4	660.6	880.9	1101.1	1321.3	1541.5	1761.7	1981.9
0.42	1.06	79.3	158.7	238.0	317.4	396.7	476.1	555.4	634.8	714.1
0.84	1.43	117.5	234.9	352.4	469.8	587.3	704.7	822.2	939.6	1057.1
0.84	0.77	217.7	435.5	653.2	871.0	1088.7	1306.4	1524.2	1741.9	1959.7
0.72	1.30	110.4	220.8	331.2	441.6	552.0	662.4	772.7	883.1	993.5
0.77	0.80	192.0	384.1	576.1	768.2	960.2	1152.2	1344.3	1536.3	1728.4
0.88	1.20	147.0	294.1	441.1	588.1	735.2	882.2	1029.2	1176.2	1323.3
0.50	1.20	82.7	165.4	248.2	330.9	413.6	496.3	579.1	661.8	744.5
0.87	1.27	137.1	274.3	411.4	548.5	685.7	822.8	959.9	1097.0	1234.2
0.59	1.47	80.4	160.9	241.3	321.7	402.2	482.6	563.0	643.5	723.9
0.63	1.33	94.7	189.4	284.1	378.8	473.5	568.3	663.0	757.7	852.4
0.44	1.25	69.4	138.7	208.1	277.5	346.8	416.2	485.5	554.9	624.3
0.45	1.46	61.6	123.2	184.8	246.4	308.0	369.6	431.2	492.8	554.4
0.77	0.95	161.8	323.5	485.3	647.1	808.8	970.6	1132.4	1294.1	1455.9
0.53	0.83	127.1	254.1	381.2	508.3	635.4	762.4	889.5	1016.6	1143.6
0.86	0.80	211.9	423.7	635.6	847.5	1059.4	1271.2	1483.1	1695.0	1906.9
0.62	0.96	127.2	254.5	381.7	508.9	636.2	763.4	890.6	1017.9	1145.1
0.82	0.73	221.7	443.3	665.0	886.7	1108.4	1330.0	1551.7	1773.4	1995.0
0.89	1.12	157.4	314.9	472.3	629.7	787.2	944.6	1102.1	1259.5	1416.9
0.58	0.75	152.8	305.7	458.5	611.4	764.2	917.1	1069.9	1222.7	1375.6
0.82	1.05	156.0	310.1	465.1	620.2	775.2	930.3	1085.3	1240.3	1395.4
0.41	0.73	111.8	223.5	335.3	447.1	558.9	670.6	782.4	894.2	1005.9
0.76	1.21	124.7	249.4	374.2	498.9	623.6	748.3	873.1	997.8	1122.5
0.84	1.01	165.7	331.3	497.0	662.7	828.3	994.0	1159.7	1325.3	1491.0
0.42	1.25	66.8	133.7	200.5	267.3	334.2	401.0	467.9	534.7	601.5
0.87	0.81	214.0	428.1	642.1	856.1	1070.1	1284.2	1498.2	1712.2	1926.3
0.69	0.88	156.3	312.6	468.9	625.1	781.4	937.7	1094.0	1250.3	1406.6
0.77	1.27	121.1	242.1	363.2	484.2	605.3	726.4	847.4	968.5	1089.5
0.43	0.86	100.0	200.0	300.0	400.1	500.1	600.1	700.1	800.1	900.1
0.78	1.17	132.3	264.6	396.9	529.2	661.5	793.8	926.2	1058.5	1190.8
0.83	0.78	211.2	422.4	633.5	844.7	1055.9	1267.1	1478.2	1689.4	1900.6
0.48	0.98	97.7	195.3	293.0	390.7	488.3	586.0	683.6	781.3	879.0
0.76	1.09	138.5	277.1	415.6	554.1	692.7	831.2	969.7	1108.2	1246.8
0.57	0.89	127.2	254.5	381.7	509.0	636.2	763.5	890.7	1018.0	1145.2
0.81	1.03	156.4	312.9	469.3	625.8	782.2	938.7	1095.1	1251.6	1408.0

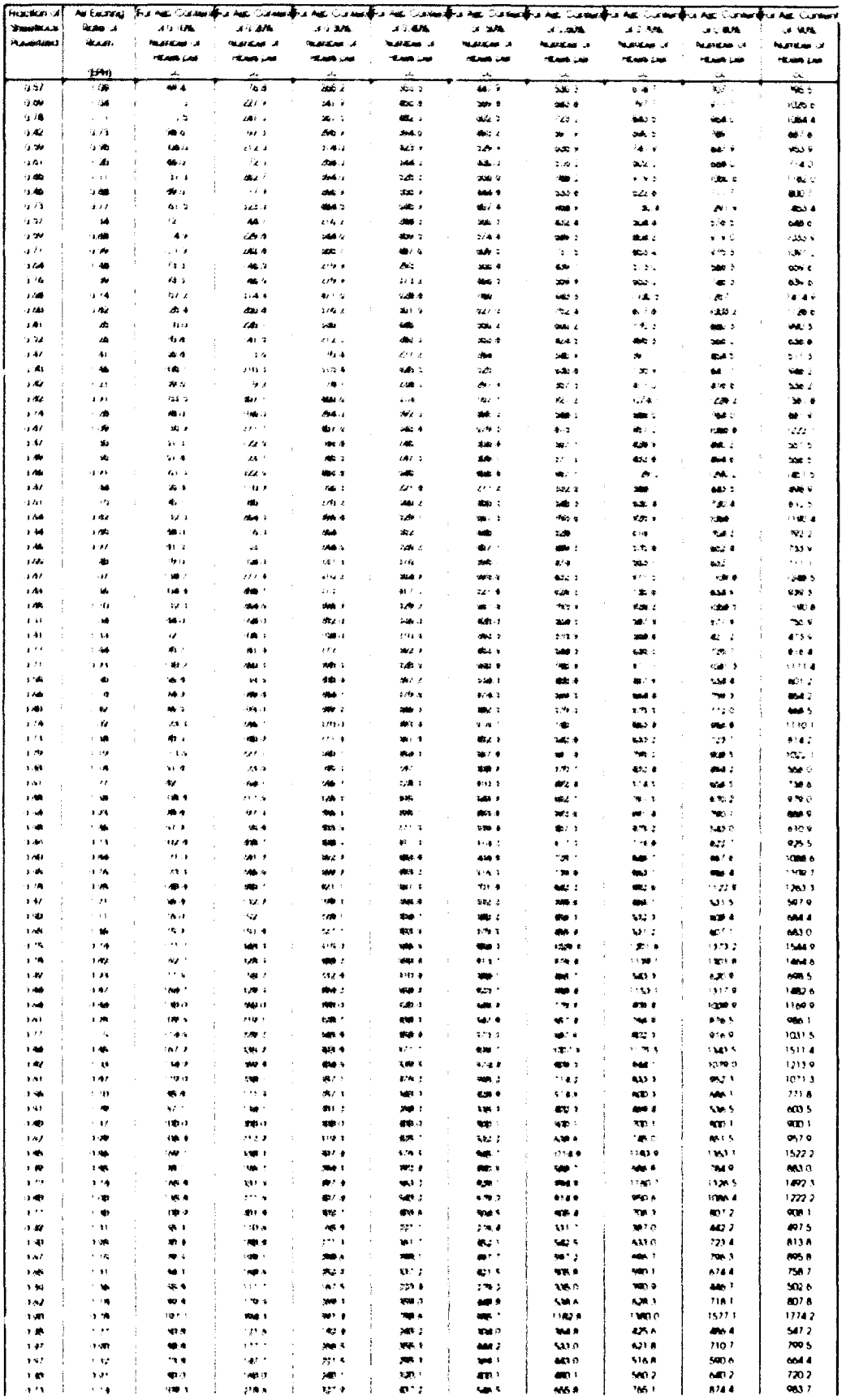
Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of 50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.57	1.09	103.1	206.2	309.4	412.5	515.6	618.7	721.8	824.9	928
0.69	1.04	133.0	265.9	398.9	531.8	664.8	797.7	930.7	[illegible]	[illegible]
0.78	1.11	140.6	281.2	421.7	562.3	702.9	843.5	[illegible]	[illegible]	[illegible]
0.42	0.73	115.1	230.2	345.3	460.3	575.4	690.5	[illegible]	[illegible]	[illegible]
0.59	0.95	123.7	247.3	371.0	494.6	618.3	741.9	[illegible]	[illegible]	[illegible]
0.61	1.20	100.3	200.7	301.0	401.4	501.7	602.0	[illegible]	[illegible]	[illegible]
0.85	1.11	153.2	306.4	459.6	612.9	766.1	919.3	[illegible]	[illegible]	[illegible]
0.46	0.88	103.8	207.6	311.4	415.2	519.0	622.8	[illegible]	[illegible]	[illegible]
0.73	0.77	188.4	376.8	565.2	753.6	942.0	[illegible]	[illegible]	[illegible]	[illegible]
0.57	1.34	84.1	168.1	252.2	336.3	420.4	504.4	[illegible]	[illegible]	[illegible]
0.59	0.88	134.0	268.1	402.1	536.1	670.1	804.2	[illegible]	[illegible]	[illegible]
0.71	0.99	142.2	284.5	426.7	568.9	711.1	853.4	[illegible]	[illegible]	[illegible]
0.64	1.48	85.5	171.0	256.5	342.0	427.5	513.0	[illegible]	[illegible]	[illegible]
0.76	1.39	108.8	217.7	326.5	435.4	544.2	653.0	[illegible]	[illegible]	[illegible]
0.68	0.74	183.4	366.8	550.2	733.6	917.1	[illegible]	[illegible]	[illegible]	[illegible]
0.60	0.82	146.3	292.6	438.9	585.2	731.5	877.8	[illegible]	[illegible]	[illegible]
0.81	1.25	128.4	256.8	385.1	513.5	641.9	770.3	[illegible]	[illegible]	[illegible]
0.52	1.26	82.5	165.1	247.6	330.2	412.7	495.3	[illegible]	[illegible]	[illegible]
0.47	1.41	66.3	132.6	198.8	265.1	331.4	397.7	[illegible]	[illegible]	[illegible]
0.90	1.46	122.7	245.3	368.0	490.6	613.3	736.0	[illegible]	[illegible]	[illegible]
0.42	1.21	69.5	139.0	208.5	278.0	347.5	417.0	[illegible]	[illegible]	[illegible]
0.82	0.91	179.1	358.2	537.4	716.5	895.6	1074.7	[illegible]	[illegible]	[illegible]
0.74	1.28	114.3	228.7	343.0	457.3	571.6	685.9	[illegible]	[illegible]	[illegible]
0.87	1.09	158.5	317.0	475.5	634.0	792.5	951.0	[illegible]	[illegible]	[illegible]
0.47	1.30	71.5	143.0	214.5	286.0	357.5	429.0	[illegible]	[illegible]	[illegible]
0.49	1.35	72.1	144.3	216.4	288.5	360.7	432.8	[illegible]	[illegible]	[illegible]
0.86	0.91	188.2	376.3	564.5	752.6	940.8	[illegible]	[illegible]	[illegible]	[illegible]
0.47	1.44	64.7	129.4	194.0	258.7	323.4	388.1	[illegible]	[illegible]	[illegible]
0.61	1.15	105.1	210.1	315.2	420.2	525.3	630.4	[illegible]	[illegible]	[illegible]
0.64	0.82	154.3	308.6	462.9	617.2	771.5	925.8	[illegible]	[illegible]	[illegible]
0.44	0.85	102.7	205.4	308.1	410.8	513.5	616.2	[illegible]	[illegible]	[illegible]
0.46	0.97	95.1	190.3	285.4	380.5	475.7	570.8	[illegible]	[illegible]	[illegible]
0.65	1.40	92.2	184.4	276.5	368.7	460.9	553.1	[illegible]	[illegible]	[illegible]
0.87	1.07	161.8	323.7	485.5	647.4	809.2	971.1	[illegible]	[illegible]	[illegible]
0.83	1.36	121.8	243.5	365.3	487.0	608.8	730.5	[illegible]	[illegible]	[illegible]
0.85	1.10	154.4	308.7	463.1	617.5	771.8	926.2	[illegible]	[illegible]	[illegible]
0.51	1.04	98.0	196.0	294.0	392.0	490.0	588.0	[illegible]	[illegible]	[illegible]
0.41	1.33	61.4	122.9	184.3	245.7	307.2	368.6	[illegible]	[illegible]	[illegible]
0.77	1.44	105.8	211.7	317.5	423.3	529.2	635.0	[illegible]	[illegible]	[illegible]
0.71	0.93	151.8	303.7	455.5	607.4	759.2	911.0	[illegible]	[illegible]	[illegible]
0.55	1.40	77.9	156.9	233.8	311.7	389.7	467.6	[illegible]	[illegible]	[illegible]
0.66	1.18	110.7	221.5	332.2	442.9	553.6	664.4	[illegible]	[illegible]	[illegible]
0.80	1.42	112.6	225.2	337.7	450.3	562.9	675.5	[illegible]	[illegible]	[illegible]
0.74	1.02	143.9	287.8	431.7	575.6	719.5	863.4	[illegible]	[illegible]	[illegible]
0.73	1.38	108.5	217.1	325.6	434.2	542.7	651.3	[illegible]	[illegible]	[illegible]
0.79	1.19	132.5	265.0	397.5	530.0	662.5	795.0	[illegible]	[illegible]	[illegible]
0.43	1.18	72.1	144.3	216.4	288.5	360.6	432.7	[illegible]	[illegible]	[illegible]
0.61	1.27	96.7	193.5	290.2	386.9	483.7	580.4	[illegible]	[illegible]	[illegible]
0.88	1.38	126.9	253.8	380.7	507.6	634.5	761.4	[illegible]	[illegible]	[illegible]
0.54	0.93	115.2	230.5	345.7	460.9	576.1	691.4	[illegible]	[illegible]	[illegible]
0.58	1.46	79.2	158.4	237.6	316.8	396.0	475.2	[illegible]	[illegible]	[illegible]
0.44	0.73	120.0	239.9	359.9	479.9	599.8	719.8	[illegible]	[illegible]	[illegible]
0.60	0.84	141.1	282.2	423.3	564.5	705.6	846.7	[illegible]	[illegible]	[illegible]
0.55	0.76	143.6	287.1	430.7	574.2	717.8	861.3	[illegible]	[illegible]	[illegible]
0.78	0.95	163.8	327.5	491.3	655.0	818.8	982.5	[illegible]	[illegible]	[illegible]
0.47	1.21	77.5	155.0	232.5	310.0	387.5	465.0	[illegible]	[illegible]	[illegible]
0.50	1.11	88.7	177.4	266.2	354.9	443.6	532.3	[illegible]	[illegible]	[illegible]
0.66	1.46	88.5	177.1	265.6	354.2	442.7	531.3	[illegible]	[illegible]	[illegible]
0.75	0.74	200.3	400.5	600.8	801.1	1001.4	[illegible]	[illegible]	[illegible]	[illegible]
0.78	0.82	189.9	379.7	569.6	759.4	949.3	[illegible]	[illegible]	[illegible]	[illegible]
0.42	0.93	90.5	181.1	271.6	362.2	452.7	[illegible]	[illegible]	[illegible]	[illegible]
0.84	0.87	192.2	384.4	576.6	768.8	961.0	[illegible]	[illegible]	[illegible]	[illegible]
0.64	0.84	151.7	303.3	455.0	606.6	758.3	[illegible]	[illegible]	[illegible]	[illegible]
0.61	0.95	127.8	255.6	383.5	511.3	639.1	[illegible]	[illegible]	[illegible]	[illegible]
0.77	1.15	133.7	267.4	401.1	534.8	668.5	[illegible]	[illegible]	[illegible]	[illegible]
0.84	0.85	198.9	397.9	596.8	795.7	994.6	[illegible]	[illegible]	[illegible]	[illegible]
0.82	1.03	157.4	314.7	472.1	629.4	786.8	[illegible]	[illegible]	[illegible]	[illegible]
0.61	0.87	138.9	277.8	416.6	555.5	694.4	[illegible]	[illegible]	[illegible]	[illegible]
0.56	1.10	100.1	200.1	300.2	400.2	500.3	[illegible]	[illegible]	[illegible]	[illegible]
0.51	1.29	78.2	156.5	234.7	312.9	391.1	[illegible]	[illegible]	[illegible]	[illegible]
0.80	1.37	116.7	233.3	350.0	466.7	583.3	[illegible]	[illegible]	[illegible]	[illegible]
0.62	0.99	124.2	248.3	372.5	496.7	620.8	[illegible]	[illegible]	[illegible]	[illegible]
0.85	0.88	197.3	394.6	591.9	789.2	986.5	[illegible]	[illegible]	[illegible]	[illegible]
0.49	0.85	114.5	229.0	343.5	458.1	572.6	[illegible]	[illegible]	[illegible]	[illegible]
0.72	0.74	193.8	387.6	581.3	775.0	968.8	[illegible]	[illegible]	[illegible]	[illegible]
0.80	1.00	158.4	316.8	475.3	633.7	792.1	[illegible]	[illegible]	[illegible]	[illegible]
0.77	1.30	117.7	235.4	353.1	470.8	588.5	[illegible]	[illegible]	[illegible]	[illegible]
0.42	1.31	68.5	136.9	205.4	273.8	342.3	[illegible]	[illegible]	[illegible]	[illegible]
0.90	0.98	108.5	217.0	325.4	433.9	542.4	[illegible]	[illegible]	[illegible]	[illegible]
0.67	1.15	116.1	232.3	348.4	464.5	580.6	[illegible]	[illegible]	[illegible]	[illegible]
0.86	1.31	98.6	197.1	295.7	394.3	492.8	[illegible]	[illegible]	[illegible]	[illegible]
0.44	1.36	65.1	130.1	195.2	260.4	325.5	[illegible]	[illegible]	[illegible]	[illegible]
0.62	1.18	108.7	217.4	326.1	434.8	543.4	[illegible]	[illegible]	[illegible]	[illegible]
0.90	0.78	208.0	416.0	624.0	832.0	1040.0	[illegible]	[illegible]	[illegible]	[illegible]
0.65	1.27	90.9	181.8	272.7	363.6	454.5	[illegible]	[illegible]	[illegible]	[illegible]
0.47	0.90	103.6	207.1	310.7	414.2	517.8	[illegible]	[illegible]	[illegible]	[illegible]
0.57	1.12	98.1	196.2	294.3	392.4	490.5	[illegible]	[illegible]	[illegible]	[illegible]
0.63	0.91	99.8	199.7	299.5	399.3	499.1	[illegible]	[illegible]	[illegible]	[illegible]
0.73	1.14	127.5	255.0	382.5	510.0	637.5	[illegible]	[illegible]	[illegible]	[illegible]

Fraction of Sheet/Plate Pulverized	Avg Etching Rate (Å/min)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.46	0.94	94.2	188.3	282.5	376.6	470.8	564.9	659.1	753.2	847.4
0.49	0.87	112.9	225.9	338.8	451.7	564.6	677.6	790.5	903.4	1016.3
0.76	0.95	158.8	317.6	476.4	635.2	794.0	952.8	1111.6	1270.4	1429.2
0.59	0.82	143.1	286.1	429.2	572.2	715.3	858.3	1001.4	1144.4	1287.5
0.49	1.48	66.1	132.2	198.3	264.4	330.6	396.7	462.8	528.9	595.0
0.48	1.18	80.4	160.8	241.2	321.5	401.9	482.3	562.7	643.1	723.5
0.46	1.02	89.7	179.3	269.0	358.7	448.4	538.0	627.7	717.4	807.1
0.45	1.21	73.4	146.8	220.1	293.5	366.9	440.3	513.6	587.0	660.4
0.68	1.14	119.0	238.0	356.9	475.9	594.9	713.9	832.8	951.8	1070.8
0.59	1.22	98.1	196.2	294.3	392.4	490.5	588.6	686.7	784.8	882.9
0.77	0.96	160.7	321.3	482.0	642.6	803.3	963.9	1124.6	1285.2	1445.9
0.61	1.08	116.4	232.8	349.1	465.5	581.9	698.3	814.6	931.0	1047.4
0.87	0.82	211.9	423.7	635.6	847.4	1059.3	1271.1	1483.0	1694.8	1906.7
0.68	1.02	123.4	246.9	370.3	493.8	617.2	740.6	864.1	987.5	1111.0
0.79	0.87	180.5	361.1	541.6	722.2	902.7	1083.3	1263.8	1444.4	1624.9
0.41	1.47	56.7	111.4	167.0	222.7	278.4	334.1	389.7	445.4	501.1
0.88	0.76	223.5	446.9	670.4	893.8	1117.3	1340.7	1564.2	1787.6	2011.1
0.63	1.07	117.8	235.7	353.5	471.4	589.2	707.1	824.9	942.8	1060.6
0.69	0.91	149.3	298.6	448.0	597.3	746.6	895.9	1045.3	1194.6	1343.9
0.67	0.93	134.2	268.4	402.6	536.8	671.0	805.2	939.4	1073.6	1207.8
0.68	1.25	104.0	208.0	312.0	416.0	520.0	623.9	727.9	831.9	935.9
0.57	0.99	114.9	229.8	344.7	459.5	574.4	689.3	804.2	919.1	1034.0
0.66	1.16	90.9	181.8	272.7	363.7	454.6	545.5	636.4	727.3	818.2
0.78	1.09	151.0	302.1	453.1	604.1	756.1	906.2	1057.2	1208.2	1359.2
0.64	1.16	142.8	285.5	428.3	571.1	713.8	856.6	999.4	1142.1	1284.9
0.61	0.87	99.5	198.9	298.5	374.0	467.5	561.1	654.6	748.1	841.6
0.62	0.86	97.0	194.1	291.1	388.1	486.2	582.2	679.2	776.2	873.3
0.66	0.88	148.1	296.3	444.4	592.5	740.7	888.8	1037.0	1185.1	1333.2
0.70	0.75	183.4	366.9	550.3	733.8	917.2	1100.7	1284.1	1467.5	1651.0
0.68	1.14	153.4	306.9	460.3	613.7	767.2	920.6	1074.0	1227.5	1380.9
0.74	0.96	111.4	222.8	334.2	445.6	557.0	668.4	779.9	891.3	1002.7
0.86	0.68	208.4	416.8	625.2	833.7	1042.1	1250.5	1458.9	1667.3	1875.7
0.82	0.88	97.4	194.8	292.2	389.6	487.0	584.4	681.8	779.2	876.6
0.59	1.10	78.6	157.2	235.8	314.4	393.0	471.6	550.2	628.8	707.4
0.93	1.37	74.1	148.3	222.4	296.6	370.7	444.9	519.0	593.2	667.3
0.87	0.79	218.8	437.5	656.3	875.1	1093.8	1312.6	1531.4	1750.1	1968.9
0.96	1.48	68.7	137.3	194.0	258.6	323.3	387.9	452.6	517.2	581.9
0.98	1.31	101.6	181.3	271.9	362.5	453.1	543.8	634.4	725.0	815.6
	Average	125	249	374	499	624	748	873	998	1123

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 70' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
70*25*8	Dimensions of Room (Ft)	396480000	Room Volume in Cubic Centimeters
14000	Cubic Footage of Room	1412080	Wall Area in Room in Square Centimeters
1520	Wall Area of Room (Sq Ft)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	15.2	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft of wall)	9.12	Gallons of ACJC Applied to Walls
		34519.2	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume within ACJC, Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.40	0.79	86.6	173.2	259.7	346.3	432.9	519.5	606.0	692.6	779.2
0.58	1.23	80.2	160.5	240.7	320.9	401.1	481.4	561.6	641.8	722.0
0.63	0.88	121.7	243.4	365.1	486.8	608.5	730.2	851.9	973.6	1095.3
0.62	1.36	78.5	157.1	235.6	314.1	392.7	471.2	549.7	628.3	706.8
0.83	0.74	191.5	382.9	574.4	765.9	957.4	1148.8	1340.3	1531.8	1723.3
0.48	0.86	94.7	189.4	284.1	378.8	473.4	568.1	662.8	757.5	852.2
0.43	0.76	96.5	193.0	289.4	385.9	482.4	578.9	675.3	771.8	868.3
0.61	1.10	93.8	187.7	281.5	375.4	469.2	563.1	656.9	750.8	844.6
0.64	1.17	92.8	185.7	278.5	371.4	464.2	557.1	649.9	742.8	835.6
0.61	0.80	131.5	263.0	394.4	525.9	657.4	788.9	920.4	1051.8	1183.3
0.90	1.35	113.6	227.3	340.9	454.6	568.2	681.9	795.5	909.2	1022.8
0.86	0.99	147.9	295.8	443.6	591.5	739.4	887.3	1035.1	1183.0	1330.9
0.43	1.43	51.3	102.6	154.0	205.3	256.6	307.9	359.3	410.6	461.9
0.50	0.74	116.5	233.0	349.4	465.9	582.4	698.9	815.3	931.8	1048.3
0.76	1.22	106.3	212.6	318.9	425.2	531.5	637.8	744.1	850.4	956.7
0.73	0.84	146.7	293.4	440.0	586.7	733.4	880.1	1026.7	1173.4	1320.1
0.40	0.72	95.9	191.8	287.7	383.7	479.6	575.5	671.4	767.3	863.2
0.55	0.96	97.0	194.0	291.1	388.1	485.1	582.1	679.2	776.2	873.2
0.56	1.40	68.7	137.4	206.1	274.8	343.5	412.2	481.0	549.7	618.4
0.48	1.08	75.8	151.7	227.5	303.4	379.2	455.1	530.9	606.8	682.6
0.69	1.21	96.9	193.9	290.8	387.8	484.7	581.7	678.6	775.5	872.5
0.84	1.16	122.5	245.0	367.4	489.9	612.4	734.9	857.4	979.8	1102.3
0.89	1.46	104.6	209.2	313.8	418.5	523.1	627.7	732.3	836.9	941.5
0.58	1.07	91.7	183.3	275.0	366.7	458.3	550.0	641.7	733.3	825.0
0.59	1.42	71.4	142.9	214.3	285.7	357.2	428.6	500.0	571.4	642.9
0.67	1.14	100.2	200.4	300.6	400.8	501.0	601.2	701.4	801.6	901.8
0.85	1.11	130.2	260.4	390.7	520.9	651.1	781.3	911.5	1041.8	1172.0
0.49	0.78	107.8	215.5	323.3	431.0	538.8	646.6	754.3	862.1	969.8
0.65	1.37	80.8	161.7	242.5	323.4	404.2	485.0	565.9	646.7	727.6
0.83	1.49	95.4	190.9	286.3	381.8	477.2	572.6	668.1	763.5	859.0
0.77	1.01	130.0	259.9	389.9	519.9	649.9	779.8	909.8	1039.8	1169.8
0.81	0.83	165.6	331.2	496.8	662.5	828.1	993.7	1159.3	1324.9	1490.5
0.42	1.25	56.7	113.3	170.0	226.6	283.3	339.9	396.6	453.2	509.9
0.88	1.24	121.3	242.5	363.8	485.0	606.3	727.5	848.8	970.1	1091.3
0.48	0.80	101.6	203.3	304.9	406.5	508.2	609.8	711.4	813.1	914.7
0.42	1.37	51.7	103.5	155.2	207.0	258.7	310.5	362.2	413.9	465.7
0.52	0.74	119.1	238.3	357.4	476.6	595.7	714.9	834.0	953.1	1072.3
0.44	0.91	83.2	166.5	249.7	333.0	416.2	499.5	582.7	666.0	749.2
0.88	0.80	188.8	377.5	566.3	755.0	943.8	1132.5	1321.3	1510.0	1698.8
0.42	1.06	68.0	136.0	204.0	272.0	340.0	408.1	476.1	544.1	612.1
0.84	1.43	100.7	201.4	302.0	402.7	503.4	604.1	704.7	805.4	906.1
0.84	0.77	186.6	373.3	559.9	746.5	933.2	1119.8	1306.4	1493.1	1679.7
0.72	1.30	94.6	189.2	283.9	378.5	473.1	567.7	662.4	757.0	851.6
0.77	0.80	164.6	329.2	493.8	658.4	823.0	987.6	1152.2	1316.8	1481.5
0.88	1.20	126.0	252.1	378.1	504.1	630.1	756.2	882.2	1008.2	1134.2
0.50	1.20	70.9	141.8	212.7	283.6	354.5	425.4	496.3	567.2	638.1
0.87	1.27	117.5	235.1	352.6	470.2	587.7	705.2	822.8	940.3	1057.9
0.59	1.47	68.9	137.9	206.8	275.8	344.7	413.6	482.6	551.5	620.5
0.63	1.33	81.2	162.4	243.5	324.7	405.9	487.1	568.3	649.4	730.6
0.44	1.25	59.5	118.9	178.4	237.8	297.3	356.7	416.2	475.6	535.1
0.45	1.46	52.8	105.6	158.4	211.2	264.0	316.8	369.6	422.4	475.2
0.77	0.95	138.7	277.3	416.0	554.6	693.3	831.9	970.6	1109.2	1247.9
0.53	0.83	108.9	217.8	326.8	435.7	544.6	653.5	762.4	871.3	980.3
0.86	0.80	181.6	363.2	544.8	726.4	908.0	1089.6	1271.2	1452.9	1634.5
0.62	0.96	109.1	218.1	327.2	436.2	545.3	654.3	763.4	872.5	981.5
0.82	0.73	190.0	380.0	570.0	760.0	950.0	1140.0	1330.0	1520.0	1710.0
0.89	1.12	134.9	269.9	404.8	539.8	674.7	809.7	944.6	1079.6	1214.5
0.58	0.75	131.0	262.0	393.0	524.0	655.0	786.0	917.1	1048.1	1179.1
0.82	1.05	132.9	265.8	398.7	531.6	664.5	797.4	930.3	1063.2	1196.1
0.41	0.73	95.8	191.6	287.4	383.2	479.0	574.8	670.6	766.4	862.2
0.76	1.21	106.9	213.8	320.7	427.6	534.5	641.4	748.3	855.2	962.2
0.84	1.01	142.0	284.0	426.0	568.0	710.0	852.0	994.0	1136.0	1278.0
0.42	1.25	57.3	114.6	171.9	229.2	286.4	343.7	401.0	458.3	515.6
0.87	0.81	183.5	366.9	550.4	733.8	917.3	1100.7	1284.2	1467.6	1651.1
0.69	0.88	134.0	267.9	401.9	535.8	669.8	803.8	937.7	1071.7	1205.6
0.77	1.27	103.8	207.5	311.3	415.1	518.8	622.6	726.4	830.1	933.9
0.43	0.86	85.7	171.5	257.2	342.9	428.6	514.4	600.1	685.8	771.6
0.78	1.17	113.4	226.8	340.2	453.6	567.0	680.4	793.8	907.2	1020.7
0.83	0.78	181.0	362.0	543.0	724.0	905.0	1086.1	1267.1	1448.1	1629.1
0.48	0.98	83.7	167.4	251.1	334.8	418.6	502.3	586.0	669.7	753.4
0.76	1.09	118.7	237.5	356.2	475.0	593.7	712.4	831.2	949.9	1068.7
0.57	0.89	109.1	218.1	327.2	436.3	545.4	654.4	763.5	872.6	981.6
0.81	1.03	134.1	268.2	402.3	536.4	670.5	804.6	938.7	1072.8	1206.9



Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.45	0.94	80.7	161.4	242.1	322.8	403.5	484.2	564.9	645.6	726.3
0.49	0.87	96.8	193.6	290.4	387.2	484.0	580.8	677.6	774.4	871.2
0.76	0.95	136.1	272.2	408.3	544.5	680.6	816.7	952.8	1088.9	1225.0
0.59	0.82	122.6	245.2	367.9	490.5	613.1	735.7	858.3	981.0	1103.6
0.49	1.48	56.7	113.3	170.0	226.7	283.3	340.0	396.7	453.3	510.0
0.48	1.18	68.9	137.8	206.7	275.6	344.5	413.4	482.3	551.2	620.1
0.46	1.02	76.9	153.7	230.6	307.4	384.3	461.2	538.0	614.9	691.8
0.45	1.21	62.9	125.8	188.7	251.6	314.5	377.4	440.3	503.2	566.1
0.68	1.14	102.0	204.0	305.9	407.9	509.9	611.9	713.9	815.9	917.8
0.59	1.22	81.5	163.0	244.5	326.0	407.5	489.0	570.6	652.1	733.6
0.77	0.96	137.7	275.4	413.1	550.8	688.5	826.2	963.9	1101.6	1239.3
0.61	1.04	99.8	199.5	299.3	399.0	498.8	598.5	698.3	798.0	897.8
0.87	0.82	181.6	363.2	544.8	726.3	907.9	1089.5	1271.1	1452.7	1634.3
0.63	1.02	105.8	211.6	317.4	423.2	529.0	634.8	740.6	846.4	952.2
0.79	0.87	154.8	309.5	464.3	619.0	773.8	928.5	1083.3	1238.0	1392.8
0.41	1.47	47.7	95.4	143.2	190.9	238.6	286.3	334.1	381.8	429.5
0.85	0.76	191.5	383.1	574.6	766.1	957.7	1149.2	1340.7	1532.2	1723.8
0.63	1.07	101.0	202.0	303.0	404.0	505.1	606.1	707.1	808.1	909.1
0.69	0.91	128.0	256.0	384.0	512.0	640.0	768.0	895.9	1023.9	1151.9
0.47	0.70	115.0	230.1	345.1	460.1	575.2	690.2	805.2	920.3	1035.3
0.65	1.25	89.1	178.3	267.4	356.5	445.7	534.8	623.9	713.1	802.2
0.57	0.99	98.5	196.9	295.4	393.9	492.4	590.8	689.3	787.8	886.3
0.43	1.06	69.4	138.7	208.1	277.4	346.8	416.1	485.5	554.8	624.2
0.78	1.03	129.5	258.9	388.4	517.8	647.3	776.7	906.2	1035.6	1165.1
0.84	1.18	122.4	244.7	367.1	489.5	611.8	734.2	856.6	979.0	1101.3
0.41	0.87	80.2	160.3	240.5	320.6	400.8	480.9	561.1	641.2	721.4
0.42	0.86	83.2	166.3	249.5	332.7	415.8	499.0	582.2	665.3	748.5
0.66	0.88	127.0	253.9	380.9	507.9	634.9	761.8	888.8	1015.8	1142.8
0.70	0.75	157.2	314.5	471.7	628.9	786.2	943.4	1100.7	1257.9	1415.1
0.88	1.14	131.5	263.0	394.5	526.1	657.6	789.1	920.6	1052.1	1183.6
0.54	0.96	95.5	191.0	286.5	382.0	477.5	573.0	668.4	763.9	859.4
0.86	0.83	178.6	357.3	535.9	714.6	893.2	1071.8	1250.5	1429.1	1607.8
0.42	0.86	83.5	167.0	250.4	333.9	417.4	500.9	584.4	667.9	751.3
0.59	1.50	67.4	134.7	202.1	269.5	336.8	404.2	471.6	538.9	606.3
0.51	1.37	63.6	127.1	190.7	254.2	317.8	381.3	444.9	508.4	572.0
0.87	0.79	187.5	375.0	562.5	750.1	937.6	1125.1	1312.6	1500.1	1687.6
0.46	1.40	55.4	110.8	166.3	221.7	277.1	332.5	387.9	443.3	498.8
0.46	1.01	77.7	155.4	233.0	310.7	388.4	466.1	543.8	621.4	699.1
	Averages:	107	214	321	428	535	642	748	855	962

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 125' * 25' * 8', FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN ACJC.

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
125*25*8	Dimensions of Room (Ft)	708000000	Room Volume in Cubic Centimeters
26000	Cubic Footage of Room	1396751.5	Wall Area in Room in Square Centimeters
1503.5	Wall Area of Room (Sq FT)	92900	Demo Rate in Square Centimeters per hour
100	Demolition Rate (Sq Ft/Hr)	15.035	Total Time to Demolish (hr)
3	ACJC Application Rate (gal/500 Sq Ft or wall)	9.021	Gallons of ACJC Applied to Walls
		34144.485	Cubic Centimeters of ACJC Applied to Walls
		1.68E-10	Fiber Volume within ACJC, Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Pulverized	Air Exching Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of .90% Number of Fibers per cc
0.40	0.79	48.5	97.0	145.4	193.9	242.4	290.9	339.4	387.9	436.3
0.58	1.23	44.9	89.9	134.8	179.7	224.6	269.6	314.5	359.4	404.3
0.63	0.88	68.2	136.3	204.5	272.6	340.8	408.9	477.1	545.2	613.4
0.62	1.36	44.0	88.0	131.9	175.9	219.9	263.9	307.8	351.8	395.8
0.83	0.74	107.2	214.4	321.7	428.9	536.1	643.3	750.6	857.8	965.0
0.48	0.86	53.0	106.1	159.1	212.1	265.1	318.2	371.2	424.2	477.2
0.43	0.76	54.0	108.1	162.1	216.1	270.1	324.2	378.2	432.2	486.2
0.61	1.10	52.6	105.1	157.7	210.2	262.8	315.3	367.9	420.4	473.0
0.64	1.17	52.0	104.0	156.0	208.0	260.0	312.0	364.0	416.0	468.0
0.61	0.80	73.6	147.3	220.9	294.5	368.1	441.8	515.4	589.0	662.7
0.90	1.35	63.6	127.3	190.9	254.6	318.2	381.8	445.5	509.1	572.8
0.86	0.99	82.8	165.6	248.4	331.2	414.1	496.9	579.7	662.5	745.3
0.43	1.43	28.7	57.5	86.2	115.0	143.7	172.5	201.2	229.9	258.7
0.50	0.74	65.2	130.5	195.7	260.9	326.1	391.4	456.6	521.8	587.0
0.76	1.22	59.5	119.1	178.6	238.1	297.6	357.2	416.7	476.2	535.8
0.73	0.84	82.1	164.3	246.4	328.6	410.7	492.8	575.0	657.1	739.2
0.40	0.72	53.7	107.4	161.1	214.8	268.6	322.3	376.0	429.7	483.4
0.55	0.96	54.3	108.7	163.0	217.3	271.7	326.0	380.3	434.7	489.0
0.56	1.40	38.5	77.0	115.4	153.9	192.4	230.9	269.3	307.8	346.3
0.48	1.08	42.5	85.0	127.4	169.9	212.4	254.9	297.3	339.8	382.3
0.69	1.21	54.3	108.6	162.9	217.2	271.4	325.7	380.0	434.3	488.6
0.84	1.16	68.6	137.2	205.8	274.4	342.9	411.5	480.1	548.7	617.3
0.89	1.46	58.6	117.2	175.8	234.3	292.9	351.5	410.1	468.7	527.3	
0.58	1.07	51.3	102.7	154.0	205.3	256.7	308.0	359.3	410.7	462.0
0.59	1.42	40.0	80.0	120.0	160.0	200.0	240.0	280.0	320.0	360.0
0.67	1.14	56.1	112.2	168.3	224.5	280.6	336.7	392.8	448.9	505.0
0.85	1.11	72.9	145.8	218.8	291.7	364.6	437.5	510.5	583.4	656.3
0.49	0.78	60.3	120.7	181.0	241.4	301.7	362.1	422.4	482.8	543.1
0.65	1.37	45.3	90.5	135.8	181.1	226.4	271.6	316.9	362.2	407.4
0.83	1.49	53.4	106.9	160.3	213.8	267.2	320.7	374.1	427.6	481.0
0.77	1.01	72.8	145.6	218.4	291.1	363.9	436.7	509.5	582.3	655.1
0.81	0.83	92.7	185.5	278.2	371.0	463.7	556.5	649.2	742.0	834.7
0.42	1.25	31.7	63.4	95.2	126.9	158.6	190.3	222.1	253.8	285.5
0.88	1.24	67.9	135.8	203.7	271.6	339.5	407.4	475.3	543.2	611.1
0.48	0.80	56.9	113.8	170.7	227.7	284.6	341.5	398.4	455.3	512.2
0.42	1.37	29.0	58.0	86.9	115.9	144.9	173.9	202.8	231.8	260.8
0.52	0.74	66.7	133.4	200.2	266.9	333.6	400.3	467.0	533.8	600.5
0.44	0.91	46.6	93.2	139.9	186.5	233.1	279.7	326.3	372.9	419.6
0.88	0.80	105.7	211.4	317.1	422.8	528.5	634.2	739.9	845.6	951.3
0.42	1.06	38.1	76.2	114.3	152.3	190.4	228.5	266.6	304.7	342.8
0.84	1.43	56.4	112.8	169.1	225.5	281.9	338.3	394.7	451.0	507.4
0.84	0.77	104.5	209.0	313.5	418.1	522.6	627.1	731.6	836.1	940.6
0.72	1.30	53.0	106.0	159.0	212.0	264.9	317.9	370.9	423.9	476.9
0.77	0.80	92.2	184.4	276.5	368.7	460.9	553.1	645.3	737.4	829.6
0.88	1.20	70.6	141.1	211.7	282.3	352.9	423.4	494.0	564.6	635.2
0.50	1.20	39.7	79.4	119.1	158.8	198.5	238.2	277.9	317.7	357.4
0.87	1.27	65.8	131.6	197.5	263.3	329.1	394.9	460.8	526.6	592.4
0.59	1.47	38.6	77.2	115.8	154.4	193.0	231.6	270.3	308.9	347.5
0.63	1.33	45.5	90.9	136.4	181.8	227.3	272.8	318.2	363.7	409.1
0.44	1.25	33.3	66.6	99.9	133.2	166.5	199.8	233.1	266.4	299.7
0.45	1.46	29.6	59.1	88.7	118.3	147.8	177.4	207.0	236.5	266.1
0.77	0.95	77.6	155.3	232.9	310.6	388.2	465.9	543.5	621.2	698.8
0.53	0.83	61.0	122.0	183.0	244.0	305.0	366.0	427.0	487.9	548.9
0.86	0.80	101.7	203.4	305.1	406.8	508.5	610.2	711.9	813.6	915.3
0.62	0.96	61.1	122.1	183.2	244.3	305.4	366.4	427.5	488.6	549.6
0.82	0.73	106.4	212.8	319.2	425.6	532.0	638.4	744.8	851.2	957.6
0.89	1.12	75.6	151.1	226.7	302.3	377.8	453.4	529.0	604.6	680.1
0.58	0.75	73.4	146.7	220.1	293.5	366.8	440.2	513.6	586.9	660.3
0.82	1.06	74.4	148.8	223.3	297.7	372.1	446.5	520.9	595.4	669.8
0.41	0.73	53.7	107.3	161.0	214.6	268.3	321.9	375.6	429.2	482.9
0.76	1.21	59.9	119.7	179.6	239.5	299.3	359.2	419.1	478.9	538.8
0.84	1.01	79.5	159.0	238.6	318.1	397.6	477.1	556.6	636.2	715.7
0.42	1.25	32.1	64.2	96.2	128.3	160.4	192.5	224.6	256.7	288.7
0.87	0.81	102.7	205.5	308.2	410.9	513.7	616.4	719.1	821.9	924.6
0.69	0.88	75.0	150.0	225.1	300.1	375.1	450.1	525.1	600.1	675.2
0.77	1.27	58.1	116.2	174.3	232.4	290.5	348.6	406.8	464.9	523.0
0.43	0.86	48.0	96.0	144.0	192.0	240.0	288.0	336.1	384.1	432.1
0.78	1.17	63.5	127.0	190.5	254.0	317.5	381.0	444.5	508.1	571.6
0.83	0.78	101.4	202.7	304.1	405.5	506.8	608.2	709.6	810.9	912.3
0.48	0.98	46.9	93.8	140.6	187.5	234.4	281.3	328.1	375.0	421.9
0.76	1.09	66.5	133.0	199.5	266.0	332.5	399.0	465.5	532.0	598.5
0.57	0.89	61.1	122.2	183.2	244.1	305.1	366.1	427.1	488.2	549.2
0.81	1.03	75.1	150.2	225.3	300.4	375.5	450.6	525.7	600.8	675.9

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of .90% Number of Fibers per cc
0.57	1.09	49.5	99.0	148.5	198.0	247.5	297.0	346.5	396.0	445.5
0.69	1.04	63.8	127.6	191.5	255.3	319.1	382.9	446.7	510.5	574.4
0.78	1.11	67.5	135.0	202.4	269.9	337.4	404.9	472.3	539.8	[illegible]
0.42	0.73	55.2	110.5	165.7	221.0	276.2	331.4	[illegible]	[illegible]	[illegible]
0.59	0.96	59.4	118.7	178.1	237.4	296.8	356.1	[illegible]	474.8	[illegible]
0.61	1.20	48.2	96.3	144.5	192.6	240.8	289.0	[illegible]	[illegible]	[illegible]
0.86	1.11	73.5	147.1	220.6	294.2	367.7	441.3	514.8	588.4	[illegible]
0.46	0.88	49.8	99.6	149.5	199.3	249.1	298.9	348.8	398.6	448.4
0.73	0.77	90.4	180.9	271.3	361.7	452.2	542.6	633.0	723.5	[illegible]
0.57	1.34	40.4	80.7	121.1	161.4	201.8	242.1	282.5	322.8	363.2
0.59	0.88	64.3	128.7	193.0	257.3	321.7	386.0	450.3	[illegible]	[illegible]
0.71	0.99	68.3	136.5	204.8	[illegible]	341.3	409.6	[illegible]	[illegible]	[illegible]
0.64	1.48	41.0	82.1	123.1	164.2	205.2	246.2	287.3	328.3	[illegible]
0.76	1.39	52.2	104.5	156.7	208.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.68	0.74	88.0	176.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.60	0.82	70.2	140.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.81	1.25	61.6	123.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.52	1.26	39.6	79.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.47	1.41	31.8	63.0	95.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.90	1.40	58.9	117.8	176.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.42	1.21	33.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.82	0.91	86.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.74	1.28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.87	1.09	76.1	152.2	228.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (1/Hr)	Pb Adj. Concentration at 10% Removal Number of Hours per cyc	Pb Adj. Concentration at 20% Removal Number of Hours per cyc	Pb Adj. Concentration at 30% Removal Number of Hours per cyc	Pb Adj. Concentration at 40% Removal Number of Hours per cyc	Pb Adj. Concentration at 50% Removal Number of Hours per cyc	Pb Adj. Concentration at 60% Removal Number of Hours per cyc	Pb Adj. Concentration at 70% Removal Number of Hours per cyc	Pb Adj. Concentration at 80% Removal Number of Hours per cyc	Pb Adj. Concentration at 90% Removal Number of Hours per cyc
0.45	0.94	46.2	90.4	135.6	180.8	226.0	271.2	316.4	361.6	406.8
0.49	0.87	54.2	108.4	162.6	216.8	271.0	325.2	379.4	433.6	487.8
0.76	0.96	76.2	152.5	228.7	304.9	381.1	457.4	533.6	609.8	686.0
0.59	0.82	68.7	137.3	205.0	274.7	343.3	412.0	480.7	549.5	618.2
0.49	1.48	51.7	83.5	90.2	120.9	150.7	180.4	222	255.9	286.6
0.48	1.18	38.6	77.2	115.8	154.5	192.9	231.5	270.1	308.7	347.3
0.46	1.02	43.0	86.1	129.1	172.2	215.2	258.3	301.3	344.3	387.4
0.46	1.21	35.2	70.4	105.7	140.9	176.1	211.3	246.5	281.8	317.0
0.48	1.14	57.1	114.2	171.3	228.4	285.5	342.7	399.8	456.9	514.0
0.59	1.22	45.6	91.3	136.9	182.6	228.2	273.9	319.5	365.2	410.8
0.77	0.96	77.1	154.2	231.3	308.5	385.6	462.7	539.8	616.9	694.0
0.61	1.04	56.9	113.7	170.6	227.4	284.3	341.2	398.0	454.9	511.8
0.67	0.82	101.7	203.4	305.1	406.8	508.4	610.1	711.8	813.5	915.2
0.63	1.02	59.3	118.5	177.8	237.0	296.3	355.5	414.8	474.0	533.3
0.79	0.87	66.7	133.3	200.0	266.7	333.3	400.0	466.6	533.3	599.9
0.41	1.47	26.7	53.5	80.2	106.9	133.6	160.4	187.1	213.9	240.6
0.86	0.76	107.3	214.5	321.8	429.0	536.3	643.5	750.8	858.1	965.3
0.63	1.07	58.6	117.1	175.7	234.3	292.9	351.4	410.0	468.6	527.1
0.69	0.91	71.7	143.4	215.0	286.7	358.4	430.1	501.7	573.4	645.1
0.47	0.70	64.4	128.8	193.3	257.7	322.1	386.5	450.9	515.3	579.6
0.66	1.26	49.9	99.8	149.7	199	249.6	299.5	349.4	399.3	449.2
0.57	0.99	55.1	110.3	165.4	220.5	275.7	330.9	386.0	441.2	496.3
0.43	1.06	38.8	77.7	116.5	155.4	194.2	233.0	271.9	310.7	349.6
0.78	1.03	72.5	146.0	217.5	290.0	362.5	435.0	507.4	579.9	652.4
0.64	1.18	68.5	137.1	205.6	274.1	342.6	411.2	479.7	548.2	616.7
0.41	0.87	44.9	89.8	134.7	179.5	224.4	269.3	314.2	359.1	404.0
0.42	0.86	46.6	93.1	139.7	186.3	232.9	279.4	326.0	372.6	419.2
0.66	0.88	71.1	142.2	213.3	284.4	355.5	426.6	497.7	568.8	639.9
0.70	0.75	88.1	176.1	264.2	352.2	440.3	528.3	616.4	704.4	792.5
0.68	1.14	73.6	147.3	220.9	294.6	368.2	441.9	515.5	589.2	662.8
0.54	0.96	53.5	107.0	160.4	213.9	267.4	320.9	374.3	427.8	481.3
0.86	0.83	100.0	200.1	300.1	400.2	500.2	600.2	700.3	800.3	900.4
0.42	0.86	46.8	93.5	140.3	187.0	233.8	280.5	327.3	374.0	420.8
0.59	1.10	37.7	75.5	113.2	150.9	188.6	226.4	264.1	301.8	339.5
0.51	1.37	35.6	71.2	106.8	142.4	177.9	213.5	249.1	284.7	320.3
0.87	0.79	105.0	210.0	315.0	420.0	525	630.0	735.1	840	945
0.46	1.40	31.0	62.1	93.1	124.1	155.2	186	217.2	248.3	279.3
0.46	1.01	43.5	87.0	130.5	174.0	217.5	261.0	304.5	348.1	391.5
	Averages	60	120	180	240	299	359	419	479	539

SPREADSHEET FOR CALCULATION OF AIRBORNE ASBESTOS FOR ROOM 200' * 25' * 8' FOR VARIOUS CONCENTRATIONS (0.1 to 0.9%) OF ASBESTOS FIBERS IN AC/C

INPUT VARIABLES		CALCULATIONS FROM INPUT VARIABLES	
200*25*8	Dimensions of Room (Ft)	[illegible]	Room Volume in Cubic Centimeters
40000	Cubic Footage of Room	[illegible]	Wall Area of Room in Square Centimeters
1609.5	Wall Area of Room (Sq Ft)	[illegible]	[illegible]
100	Demolition Rate (Sq Ft/Hr)	[illegible]	Total Time to Demolish (hr)
3	AC/C Application Rate (gal/500 Sq Ft of wall)	[illegible]	Gallons of AC/C Applied to Walls
		[illegible]	Cubic Centimeters of AC/C Applied to Walls
		[illegible]	Fiber Volume within AC/C Based on an Even Distribution of Fibers 5, 6, 7, 8, and 9 micrometers in length, each having an aspect ratio of 3 to 1 (cc)

Fraction of Sheetrock Removed	Air Exchange Rate of Room (EPH)	For Asb. Concentration of 0.1% Number of Fibers per cc	For Asb. Concentration of 0.2% Number of Fibers per cc	For Asb. Concentration of 0.3% Number of Fibers per cc	For Asb. Concentration of 0.4% Number of Fibers per cc	For Asb. Concentration of 0.5% Number of Fibers per cc	For Asb. Concentration of 0.6% Number of Fibers per cc	For Asb. Concentration of 0.7% Number of Fibers per cc	For Asb. Concentration of 0.8% Number of Fibers per cc	For Asb. Concentration of 0.9% Number of Fibers per cc
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.48	1.48	18.5	37.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.77	0.96	48.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.53	0.83	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.88	0.80	63.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.62	0.96	38.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.82	0.73	46.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.89	1.12	47.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.58	0.75	45.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.82	1.08	46.5	93.0	139.5	186.1	232.6	279.1	325.6	[illegible]	418.6
0.41	0.73	33.5	67.1	100.6	134.1	[illegible]	201.2	[illegible]	[illegible]	[illegible]
0.76	1.21	37.4	74.8	112.3	[illegible]	[illegible]	224.5	[illegible]	[illegible]	[illegible]
0.84	1.01	49.7	99.4	[illegible]	[illegible]	248.5	[illegible]	[illegible]	[illegible]	[illegible]
0.42	1.36	20.1	40.1	60.2	80.2	100.3	120.3	140.4	160.5	180.5
0.87	0.81	64.2	128.4	192.6	256.8	321.0	385.3	449.5	513.7	577.9
0.69	0.88	46.9	93.8	140.7	187.5	234.4	281.3	328.2	375.1	422.0
0.77	1.37	36.3	72.6	109.0	145.3	181.6	217.9	254.2	290.5	326.9
0.43	0.86	30.0	60.0	90.0	120.0	150.0	180.0	210.0	240.0	270.0
0.79	1.17	39.7	79.4	119.1	158.8	198.5	238.2	277.9	317.6	357.3
0.80	0.78	63.4	126.7	190.1	253.4	316.8	380.1	443.5	506.8	570.2
0.48	0.98	29.3	58.6	87.9	117.2	146.5	175.8	205.1	234.4	263.7
0.76	1.09	41.6	83.1	124.7	166.2	207.8	249.4	290.9	332.5	374.0
0.57	0.89	38.2	76.3	114.5	152.7	190.8	229.0	267.2	305.4	343.5
0.81	1.03	46.9	93.9	140.8	187.7	234.7	281.6	328.5	375.5	422.4

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10%, Number of Fibers per cc	For Asb Content of 0.20%, Number of Fibers per cc	For Asb Content of 0.30%, Number of Fibers per cc	For Asb Content of 0.40%, Number of Fibers per cc	For Asb Content of .50%, Number of Fibers per cc	For Asb Content of 0.60%, Number of Fibers per cc	For Asb Content of 0.70%, Number of Fibers per cc	For Asb Content of 0.80%, Number of Fibers per cc	For Asb Content of .90%, Number of Fibers per cc
0.57	1.09	30.9	61.9	92.8	123.7	154.7	185.6	216.5	247.5	278.4
0.69	1.04	39.9	79.8	119.7	159.5	199.4	239.3	279.2	319.1	359.0
0.78	1.11	42.2	84.3	126.5	168.7	210.9	253.0	295.2	337.4	379.6
0.42	0.73	34.5	69.1	103.6	138.1	172.6	207.2	241.7	276.2	310.7
0.59	0.95	37.1	74.2	111.3	148.4	185.5	222.6	259.7	296.8	333.9
0.61	1.20	30.1	60.2	90.3	120.4	150.5	180.6	210.7	240.8	270.9
0.85	1.11	46.0	91.9	137.9	183.9	229.8	275.8	321.8	367.7	413.7
0.46	0.88	31.1	62.3	93.4	124.6	156.7	186.8	218.0	249.1	280.3
0.73	0.77	56.5	113.0	169.6	226.1	282.6	339.1	395.6	452.2	508.7
0.57	1.34	25.2	50.4	75.7	100.9	126.1	151.3	176.6	201.8	227.0
0.59	0.88	40.2	80.4	120.6	160.8	201.0	241.2	281.5	321.7	361.9
0.71	0.99	42.7	85.3	128.0	170.7	213.3	256.0	298.7	341.3	384.0
0.64	1.48	25.6	51.3	76.9	102.6	128.2	153.9	179.5	205.2	230.8
0.76	1.39	32.7	65.3	98.0	130.6	163.3	195.9	228.6	261.2	293.9
0.68	0.74	55.0	110.0	166.1	220.1	275.1	330.1	385.2	440.2	495.2
0.60	0.82	43.9	87.8	131.7	175.6	219.5	263.3	307.2	351.1	395.0
0.81	1.25	38.5	77.0	115.5	154.1	192.6	231.1	269.6	308.1	346.6
0.52	1.26	24.8	49.5	74.3	99.1	123.8	148.6	173.3	198.1	222.9
0.47	1.41	19.9	39.8	59.7	79.5	99.4	119.3	139.2	159.1	179.0
0.90	1.46	36.8	73.6	110.4	147.2	184.0	220.8	257.6	294.4	331.2
0.42	1.21	20.9	41.7	62.6	83.4	104.3	125.1	146.0	166.8	187.7
0.82	0.91	53.7	107.5	161.2	214.9	268.7	322.4	376.2	429.9	483.6
0.74	1.28	34.3	68.6	102.9	137.2	171.5	205.8	240.1	274.4	308.7
0.87	1.09	47.5	95.1	142.6	190.2	237.7	285.3	332.8	380.4	427.9
0.47	1.30	21.4	42.9	64.3	85.8	107.2	128.7	150.1	171.6	193.0
0.89	1.36	21.6	43.3	64.9	86.6	108.2	129.8	151.5	173.1	194.8
0.86	0.91	56.4	112.9	169.3	225.8	282.2	338.7	395.1	451.6	508.0
0.47	1.44	19.4	38.8	58.2	77.6	97.0	116.4	135.8	155.2	174.6
0.61	1.15	31.5	63.0	94.6	126.1	157.6	189.1	220.6	252.1	283.7
0.66	0.82	46.3	92.6	138.9	185.2	231.5	277.8	324.0	370.3	416.6
0.44	0.96	30.8	61.6	92.4	123.2	154.0	184.8	215.6	246.5	277.3
0.48	0.97	28.5	57.1	85.6	114.2	142.7	171.2	199.8	228.3	256.9
0.66	1.40	27.7	55.3	83.0	110.6	138.3	165.9	193.6	221.2	248.9
0.87	1.07	48.6	97.1	145.7	194.2	242.8	291.3	339.9	388.4	437.0
0.83	1.16	36.5	73.1	109.6	146.1	182.6	219.2	255.7	292.2	328.8
0.85	1.10	46.3	92.6	138.9	185.2	231.5	277.9	324.2	370.5	416.8
0.71	1.08	29.4	58.8	88.2	117.6	147.0	176.4	205.8	235.2	264.6
0.81	1.13	14.8	29.9	56.3	73.7	92.1	110.6	129.0	147.4	165.8
0.77	1.44	31.8	63.5	95.3	127.0	158.8	190.5	222.3	254.0	285.8
0.71	0.93	45.6	91.1	136.7	182.2	227.8	273.3	318.9	364.4	410.0
0.85	1.40	23.4	46.8	70.1	93.5	116.9	140.3	163.7	187.0	210.4
0.66	1.18	33.2	66.4	99.7	132.9	166.1	199.3	232.5	265.7	299.0
0.80	1.02	33.8	67.5	101.3	135.1	168.9	202.6	236.4	270.2	304.0
0.74	1.02	43.2	86.3	129.5	172.7	215.9	259.0	302.2	345.4	388.5
0.73	1.18	31.7	63.3	95.0	126.6	158.3	190.0	221.6	253.3	285.0
0.79	1.19	39.7	79.5	119.2	159.0	198.7	238.5	278.2	318.0	357.7
0.88	1.19	21.6	43.2	64.9	86.5	108.1	129.7	151.4	173.0	194.6
0.91	1.27	28.7	57.4	86.2	114.9	143.6	172.3	201.1	229.8	258.5
0.88	1.18	38.1	76.1	114.2	152.3	190.4	228.4	266.5	304.6	342.7
0.96	1.23	34.6	69.1	103.7	138.3	172.8	207.4	242.0	276.5	311.1
0.98	1.19	23.8	47.5	71.3	95.0	118.8	142.5	166.3	190.1	213.8
0.86	0.73	46.0	92.0	138.0	184.0	230.0	275.9	321.9	367.9	323.9
0.82	0.86	42.3	84.7	127.0	169.3	211.7	254.0	296.3	338.7	381.0
0.78	0.76	49.2	98.3	147.5	196.7	245.9	295.0	344.2	393.4	442.5
0.79	1.06	49.1	98.3	147.4	196.5	245.6	294.8	343.9	393.0	442.2
0.87	1.27	23.1	46.3	69.4	92.6	115.7	138.9	162.0	185.0	208.3
0.80	1.11	26.6	53.2	79.8	106.5	133.1	159.7	186.3	212.9	239.5
0.68	1.06	26.6	53.1	79.7	106.2	132.8	159.4	185.9	212.5	239.1
0.78	0.74	48.1	96.2	144.3	192.5	240.6	288.8	337.0	385.1	433.3
0.78	0.82	57.3	114.7	172.0	229.4	286.8	344.1	401.5	458.8	516.2
0.82	0.89	27.2	54.3	81.5	108.7	135.9	163.0	190.1	217.3	244.5
0.68	0.87	57.7	115.3	173.0	230.6	288.3	345.9	403.6	461.3	518.9
0.68	0.88	38.3	76.6	114.9	153.2	191.5	229.8	268.1	306.4	344.7
0.61	1.06	38.1	76.1	114.3	152.4	190.4	228.5	266.6	304.8	342.9
0.77	1.15	40.1	80.2	120.3	160.4	200.5	240.6	280.7	320.8	361.0
0.68	1.06	48.8	97.6	146.4	195.2	244.0	292.8	341.6	390.4	439.2
0.82	1.25	37.7	75.4	113.1	150.8	188.5	226.2	263.9	301.6	339.3
0.87	1.27	41.7	83.3	125.0	166.7	208.3	250.0	291.6	333.3	375.0
0.78	1.10	40.3	80.5	120.8	161.0	201.3	241.5	281.8	322.0	362.3
0.81	1.19	33.5	66.9	100.4	133.8	167.3	200.7	234.2	267.6	301.1
0.88	1.19	37.5	74.9	112.4	149.8	187.3	224.7	262.2	299.6	337.1
0.68	1.06	38.3	76.6	114.9	153.2	191.5	229.8	268.1	306.4	344.7
0.89	1.06	38.1	76.1	114.1	152.2	190.2	228.2	266.3	304.3	342.4
0.72	1.19	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.80	1.19	37.5	74.9	112.4	149.8	187.3	224.7	262.2	299.6	337.1
0.68	1.19	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.67	1.19	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.65	1.19	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.68	1.19	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.62	1.19	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.69	1.19	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.65	1.27	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.67	1.19	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.57	1.19	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.68	1.27	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9
0.79	1.19	38.1	76.2	114.3	152.4	190.5	228.6	266.7	304.8	342.9

Fraction of Sheetrock Pulverized	Air Exchng Rate of Room (EPH)	For Asb Content of 0.10% Number of Fibers per cc	For Asb Content of 0.20% Number of Fibers per cc	For Asb Content of 0.30% Number of Fibers per cc	For Asb Content of 0.40% Number of Fibers per cc	For Asb Content of .50% Number of Fibers per cc	For Asb Content of 0.60% Number of Fibers per cc	For Asb Content of 0.70% Number of Fibers per cc	For Asb Content of 0.80% Number of Fibers per cc	For Asb Content of 90% Number of Fibers per cc
0.46	0.94	28.2	56.5	84.7	113.0	141.2	169.5	197.7	226.0	254.2
0.49	0.87	33.9	67.8	101.6	135.5	169.4	203.3	237.1	271.0	304.9
0.76	0.95	47.6	95.3	142.9	190.6	238.2	285.8	333.5	381.1	428.8
0.59	0.82	42.9	85.8	128.7	171.7	214.6	257.5	300.4	343.3	386.2
0.49	1.48	19.8	39.7	59.5	79.3	99.2	119.0	138.8	158.7	178.5
0.48	1.18	24.1	48.2	72.3	96.5	120.6	144.7	168.8	192.9	217.0
0.46	1.02	26.9	53.8	80.7	107.6	134.5	161.4	188.3	215.2	242.1
0.45	1.21	22.0	44.0	66.0	88.1	110.1	132.1	154.1	176.1	198.1
0.68	1.14	35.7	71.4	107.1	142.8	178.5	214.2	249.9	285.5	321.2
0.59	1.22	28.5	57.1	85.6	114.1	142.6	171.2	199.7	228.2	256.7
0.77	0.96	48.2	96.4	144.6	192.8	241.0	289.2	337.4	385.6	433.8
0.61	1.04	34.9	69.8	104.7	139.7	174.6	209.5	244.4	279.3	314.2
0.87	0.82	63.6	127.1	190.7	254.2	317.8	381.3	444.9	508.4	572.0
0.63	1.02	37.0	74.1	111.1	148.1	185.2	222.2	259.2	296.3	333.3
0.79	0.87	54.2	108.3	162.5	216.7	270.8	325.0	379.2	433.3	487.5
0.41	1.47	16.7	33.4	50.1	66.8	83.5	100.2	116.9	133.6	150.3
0.85	0.76	67.0	134.1	201.1	268.1	335.2	402.2	469.3	536.3	603.3
0.63	1.07	35.4	70.7	106.1	141.4	176.8	212.1	247.5	282.8	318.2
0.69	0.91	44.8	89.6	134.4	179.2	224.0	268.8	313.6	358.4	403.2
0.47	0.70	40.3	80.5	120.8	161.0	201.3	241.6	281.8	322.1	362.4
0.65	1.25	31.2	62.4	93.6	124.8	156.0	187.2	218.4	249.6	280.8
0.57	0.99	34.5	68.9	103.4	137.9	172.3	206.8	241.3	275.7	310.2
0.43	1.06	24.3	48.5	72.8	97.1	121.4	145.6	169.9	194.2	218.5
0.78	1.03	45.3	90.6	135.9	181.2	226.5	271.8	317.2	362.5	407.8
0.84	1.18	42.8	85.7	128.5	171.3	214.1	257.0	299.8	342.6	385.5
0.41	0.87	28.1	56.1	84.2	112.2	140.3	168.3	196.4	224.4	252.5
0.42	0.86	29.1	58.2	87.3	116.4	145.5	174.7	203.8	232.9	262.0
0.66	0.88	44.4	88.9	133.3	177.8	222.2	266.6	311.1	355.5	400.0
0.70	0.75	55.0	110.1	165.1	220.1	275.2	330.2	385.2	440.3	495.3
0.88	1.14	46.0	92.1	138.1	184.1	230.2	276.2	322.2	368.2	414.3
0.54	0.96	33.4	66.8	100.3	133.7	167.1	200.5	234.0	267.4	300.8
0.86	0.83	62.5	125.0	187.6	250.1	312.6	375.1	437.7	500.2	562.7
0.42	0.86	29.2	58.4	87.7	116.9	146.1	175.3	204.5	233.8	263.0
0.59	1.50	23.6	47.2	70.7	94.3	117.9	141.5	165.0	188.6	212.2
0.51	1.37	22.2	44.5	66.7	89.0	111.2	133.5	155.7	177.9	200.2
0.87	0.79	65.6	131.3	196.9	262.5	328.1	393.8	459.4	525.0	590.7
0.46	1.40	19.4	38.8	58.2	77.6	97.0	116.4	135.8	155.2	174.6
0.46	1.01	27.2	54.4	81.6	108.8	135.9	163.1	190.3	217.5	244.7
	Averages:	37	75	112	150	187	225	262	299	337

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Vita

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13. ABSTRACT *(Maximum 200 words)*

This study investigated the differing regulatory guidelines from the Occupational Safety and Health Administration and the Environmental Protection Agency concerning the abatement of Asbestos Containing Joint Compound (ACJC). The specific interest was whether or not adequate protection was being afforded demolition workers when exposed to working with ACJC materials that contain less than 1.0 percent asbestos. A spreadsheet was written to estimate the exposure scenario which might be experienced within a given room size on a demolition or renovation jobsite. Spreadsheets were calculated for ACJC with an asbestos content of 0.1 to 0.9 percent in 0.1 increments for rooms ranging in size from 15ft x 25ft x 8ft to 200ft x 25ft x 8ft. Two hundred iterations were used to compute an average exposure concentration for each room size, each size being represented by a spreadsheet. In all cases, the results indicated that the exposure potential created by the manual demolition of ACJC exceeded the OSHA permissible exposure limit of 0.2 f/cc. This finding resulted in the conclusion that personal air sampling should be conducted on individuals to determine if the exposure levels simulated in this research are comparable to those experienced in the workplace. Until this research is validated by such efforts, it is recommended that ACJC abatement actions be performed within negative air containment systems equipped with high efficiency particulate air (HEPA) filters.

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